



RPC24 694xx Series CLI Reference Guide

For firmware release GL200 or later

Abstract

This guide provides information about managing a Phoenix International RPC24 694xx Series storage system by using its command-line interface (CLI).

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Adobe PostScript

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About this guide

This guide provides information about managing a Phoenix International RPC24™ storage system by using its command-line interface (CLI).

Intended audience

This guide is intended for storage system administrators.

Prerequisites

Prerequisites for using this product include knowledge of:

- Network administration
- Storage system configuration
- Storage area network (SAN) management and direct attach storage (DAS)
- Fibre Channel, Serial Attached SCSI (SAS), Internet SCSI (iSCSI), and Ethernet protocols

Related documentation

For information about	See
Enhancements, known issues, and late-breaking information not included in product documentation	Release Notes
Overview of product shipkit contents and setup tasks	Getting Started*
Regulatory compliance and safety and disposal information	RPC24 Product Regulatory Compliance and Safety*
Using a rackmount bracket kit to install an enclosure into a rack	RPC24 Rackmount Bracket Kit Installation* <i>or</i> RPC24 2-Post Rackmount Bracket Kit Installation*
Product hardware setup and related troubleshooting	RPC24 694xx Series Setup Guide
Obtaining and installing a license to use licensed features	RPC24 694xx Series Obtaining and Installing a License
Using the web interface to configure and manage the product	RPC24 694xx Series Storage Management Guide
Using the command-line interface (CLI) to configure and manage the product	RPC24 694xx Series CLI Reference Guide
Event codes and recommended actions	RPC24 Event Descriptions Reference Guide
Identifying and installing or replacing field-replaceable units (FRUs)	RPC24 694xx Series FRU Installation and Replacement Guide


* Printed document included in product shipkit.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Blue text	Cross-reference links and e-mail addresses
Blue, underlined text	Web site addresses
Bold font	<ul style="list-style-type: none">• Key names• Text typed into a GUI element, such as into a box• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italics font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none">• File and directory names• System output• Code• Text typed at the command-line
<i>Monospace, italic font</i>	<ul style="list-style-type: none">• Code variables• Command-line variables
Monospace, bold font	Emphasis of file and directory names, system output, code, and text typed at the command line

 **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

 **IMPORTANT:** Provides clarifying information or specific instructions.

NOTE: Provides additional information.

 **TIP:** Provides helpful hints and shortcuts.

1 Using the CLI

This chapter introduces the RPC24 694xx Series command-line interface (CLI).

In this guide:

- The term *disk group* refers to either a vdisk for linear storage or a virtual disk group for virtual storage.
- The term *pool* refers to either a single vdisk for linear storage or a virtual pool for virtual storage.

Accessing the CLI

The CLI software embedded in the controller modules enables you to manage and monitor storage-system operation. You can access the CLI in two ways:

- By using HTTP, HTTPS, Telnet, an SSH application, or a terminal emulator on a management host that is remotely connected through a LAN to a controller module's network port.
- By using a terminal emulator on a management host that is directly connected to a controller module's serial CLI port.

For information about accessing the CLI and obtaining IP values for storage-system management, see your product's Setup Guide.

Table 2 Default usernames and passwords

Username	Password	Roles
monitor	!monitor	Monitor (view only)
manage	!manage	Monitor, Manage (view and change)

CLI output formats

The CLI has two output formats:

- Console format, which is the human-to-computer interface (HCI).
- XML API format, which is the computer-to-computer interface (CCI).

Console format enables users to interact with the CLI and obtain easily readable information. This format automatically sizes fields according to content and adjusts content to window resizes. These capabilities would present problems for a CCI in the form of scripts or other client software.

XML API format enables any external application to interact with the storage system. The XML format is constructed to permit new fields to be added without impacting existing clients if they follow standard XML parsing conventions.

Scripting is not supported using console format because labels, field sizes, and order of fields may change in future firmware releases. To properly script CLI commands use XML API format, which is expected to remain consistent from release to release; field names will be consistent and new functionality will be added as new fields. These types of changes in XML output will not impact a conventional XML parsing engine.

You can change the CLI output format by using the [set cli-parameters](#) command; see "Example" (page 165).

Using CLI interactively

By default the CLI is an interactive application. When you are logged into the CLI, the CLI waits for a command to be entered and then responds to it.

The following example shows interactively starting a Telnet session, logging into the CLI, executing a command to show volumes, and exiting the CLI:

```
$: telnet IP-address
IP-address

System Version: version
MC Version: version
Serial Number: SN
172.22.5.55 login: monitor
Password:

product
System Name: Test
System Location: Lab
Version: version
# show volumes
Pool          Name                Total Size Alloc Size Class      Type
  Health Reason Action
-----
dg0001      dg0001_v0001          100.7GB   100.7GB   Linear   standard
  OK
-----
Success: Command completed successfully. (2014-07-10 13:43:36)

# exit
```

Using a script to access the CLI

The following example shows how to construct a Perl script to communicate with the CLI via Telnet. `cLogin` is called at the start of the script to log a user into the CLI. The script uses the command-line parameters specified as the IP address, username, and password. After the user has been logged in, other commands can be sent to the CLI.

```
use Net::Telnet;
sub cLogin {
    $telnet->open($_[0]);
    $telnet->waitfor(/(login|username)[ : ]*/i);
    $telnet->print($_[1]);
    $telnet->waitfor(/password[ : ]*/i);
    $telnet->print($_[2]);
    # either got a login or a prompt
    @ok = $telnet->waitfor(/(#!login:*) /i);
    if ($debug_commands == 1) { print "-"; print @ok; print "-\n"; }
    if ($ok[1] =~ m/login/gi)
    {
        return 0;
    }
    else
    {
        return 1;
    }
}
$ipAddr = $ARGV[0];
$username = $ARGV[1];
$password = $ARGV[2];
```

```

$stelnet = new Net::Telnet ( Timeout=>10,
Errmode=>'die',
Prompt => '/\# $/i');
if ( !cLogin($ipAddr, $username, $password) == 1 )
{
    print("Error: $username user failed to log in. Exiting.\n");
    $stelnet->close;
    exit(0);
}

```

For scripting support, the following command can be used to access the XML API and to disable the paging mode that pauses for each full screen of command output.

```
$stelnet->cmd("set cli-parameters api-embed pager disabled");
```

The following code segment shows how to get the entire configuration information from the CLI and print the output. The output can easily be redirected to a file for archiving.

```

@sV = $stelnet->cmd("show configuration");
for ($i=0; $i<scalar(@sV); $i++)
{
    print ("@sV[ $i ]");
}

```

Because basic command-line semantics provide prompts for user input and response time is indeterminate, scripts must use an “expect”-type mechanism to scan output for prompts. It is more efficient to use the HTTP interface to access the XML API. The following example shows how to construct a Perl script to communicate with the XML API via HTTP.

```

use LWP::UserAgent;
use Digest::MD5 qw(md5_hex);
use XML::LibXML;

# generate MD5 hash using default username/password
my $md5_data = "manage!manage";
my $md5_hash = md5_hex( $md5_data );
print "$md5_hash\n";

# create the URL and send an http GET request

$ua = LWP::UserAgent->new;
$url = 'http://10.0.0.2/api/login/' . $md5_hash;

print ("Sending to $url\n");
$req = HTTP::Request->new(GET => $url);

$res = $ua->request($req);

# Parse the XML content using LibXML to obtain the session key

print $res->content;

my $parser = XML::LibXML->new();
my $doc = $parser->parse_string( $res->content );

my $root = $doc->getDocumentElement;
my @objects = $root->getElementsByTagName('OBJECT');
my @props = $objects[0]->getElementsByTagName('PROPERTY');

my $sessionKey;

foreach my $prop ( @props ) {
    my $name = $prop->getAttribute('name');

```

```

    print "Property = " . $name . "\n";

    if( $name eq 'response' ) {
        $sessionKey = $prop->textContent;
    }
}

print "Session Key = $sessionKey\n";

# Run a sample command to obtain the disks in the system.

$url = 'http://10.0.0.2/api/show/disks';
$req = HTTP::Request->new(GET => $url);
$req->header('sessionKey' => $sessionKey );
$req->header('dataType' => 'ipa' );

$res = $ua->request($req);

$url2 = 'http://10.0.0.2/api/exit';
$req2 = HTTP::Request->new(GET => $url3);
$req2->header('sessionKey' => $sessionKey );
$req2->header('dataType' => 'api' );

$res2 = $ua->request($req2);

print $res->content;

```

The next section provides more information about using the XML API.

Using the XML API

The Management Controller provides access for monitoring and management via the Telnet and SSH protocols for command-line interface semantics, or via the HTTP and HTTPS protocols for XML API request/response semantics.

You can use an XML parser, such as `XML::Parser` in Perl, to process the XML output and store this information as objects.

The output of each CLI command is composed of valid XML data until the CLI prompt (typically #) is encountered. The output contains a valid XML header followed by the XML elements described in the following table.

Table 3 XML API elements

Element	Description and attributes
RESPONSE	<p>The RESPONSE element is the top-level element, which contains all data output for the CLI command that was issued. The response includes:</p> <ul style="list-style-type: none">• A number of OBJECT elements, which varies by command.• A status object that provides a message and return code. A return code of 0 indicates that the command succeeded. Any other return code is an error code. <p>There is only one RESPONSE element per issued command.</p>
OBJECT	<p>In general, an OBJECT element describes a storage-system component such as a disk or a volume. An object has these attributes:</p> <ul style="list-style-type: none">• <code>basetype</code>. This attribute allows output in brief mode to be correlated with metadata to reduce the overhead of each command, as described in XML API optimization. This is also a good field to use to detect the type of the object (e.g., a disk, a volume, etc.).• <code>name</code>. The name of the object.• <code>oid</code>. The unique identifier for the object in the scope of the response. <p>The OBJECT element can contain PROPERTY elements.</p>
PROPERTY	<p>A PROPERTY element provides detail about the attributes of an OBJECT. A property has these attributes:</p> <ul style="list-style-type: none">• <code>name</code>. The unique name for the property within the object.• <code>key</code>. Indicates whether this property is a key value to identify this object.• <code>type</code>. The type of data represented by the element data.• <code>size</code>. Typically the maximum size of the output. Usually only important if the console output is displayed in rows.• <code>draw</code>. Whether to show or hide this data in console format.• <code>sort</code>. The type of sorting that can be applied to this property.• <code>display-name</code>. The label for this data to show in user interfaces.
COMP	<p>A COMP (composition) element associates nested objects, such as a task object within a schedule object. A composition element has these attributes:</p> <ul style="list-style-type: none">• <code>P</code>. The oid of the part component.• <code>G</code>. The oid of the group component. <p>An alternative to using COMP elements is described in XML API optimization.</p>
ASC	<p>The association element provides a simple association description between two objects in the response.</p> <ul style="list-style-type: none">• <code>A</code>. First object.• <code>B</code>. Second object.

Scripting guidelines

When scripting command input, use CLI syntax as defined in this guide. For use with Telnet or SSH, use a space character between command names, parameters, and their values (as shown throughout this guide). For use with the HTTP interface, use a '/' character instead of a space character between command names, parameters, and their values.

When writing scripts to parse XML API output, use an XML library to parse the data. For parsing, a script should *not* rely on ordering, spacing, or column position. To find a specific property, a script should compare property names as it searches through the data. This allows the script to be compatible with future versions that could potentially add new fields to the output.

The output of show commands is intended for monitoring or obtaining the current configuration. Other commands provide configuration data and display one or more status objects that specify the status of command processing. The last status object specifies the overall status of the command; other status objects indicate intermediate processing status.

The following example shows the XML API status object:

```
<OBJECT basetype="status" name="status" oid="1">
  <PROPERTY name="response-type" type="string" size="12" draw="false"
sort="nosort" display-name="Response Type">Success</PROPERTY>
  <PROPERTY name="response-type-numeric" type="uint32" size="12" draw="false"
sort="nosort" display-name="Response Type">0</PROPERTY>
  <PROPERTY name="response" type="string" size="180" draw="true" sort="nosort"
display-name="Response">Command completed successfully. (2014-07-10
13:52</PROPERTY>
  <PROPERTY name="return-code" type="sint32" size="15" draw="false"
sort="nosort" display-name="Return Code">0</PROPERTY>
  <PROPERTY name="component-id" type="string" size="80" draw="false"
sort="nosort" display-name="Component ID"></PROPERTY>
  <PROPERTY name="time-stamp" type="string" size="25" draw="false"
sort="datetime" display-name="Time">2014-07-10 13:52:45</PROPERTY>
  <PROPERTY name="time-stamp-numeric" type="uint32" size="25" draw="false"
sort="datetime" display-name="Time">1405000365</PROPERTY>
</OBJECT>
```

In a script, each command should check the previous command's status before proceeding. If the value of the status object's return-code property is 0, the command succeeded; any other value means that the command failed.

XML API examples

The following example shows a command formatted for use with the command-line interface and for use with the HTTPS interface, and its XML API output.

- Command-line interface format: create user JSmith interfaces wbi password Abc#1379
- HTTP interface format: create/user/JSmith/interfaces/wbi/password/Abc#1379

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE VERSION="L100">
  <OBJECT basetype="status" name="status" oid="1">
    <PROPERTY name="response-type" type="string" size="12" draw="false"
sort="nosort" display-name="Response Type">Success</PROPERTY>
    <PROPERTY name="response-type-numeric" type="uint32" size="12" draw="false"
sort="nosort" display-name="Response Type">0</PROPERTY>
    <PROPERTY name="response" type="string" size="180" draw="true" sort="nosort"
display-name="Response">Command completed successfully. (JSmith) - The new user
was created. (2014-07-10 14:16:29)</PRO
PERTY>
    <PROPERTY name="return-code" type="sint32" size="15" draw="false"
sort="nosort" display-name="Return Code">0</PROPERTY>
    <PROPERTY name="component-id" type="string" size="80" draw="false"
sort="nosort" display-name="Component ID">JSmith</PROPERTY>
    <PROPERTY name="time-stamp" type="string" size="25" draw="false"
sort="datetime" display-name="Time">2014-07-10 14:16:29</PROPERTY>
```

```

    <PROPERTY name="time-stamp-numeric" type="uint32" size="25" draw="false"
sort="datetime" display-name="Time">1405001789</PROPERTY>
  </OBJECT>
</RESPONSE>

```

XML API optimization

The following are two ways to optimize XML API performance:

- Use embedded objects. This allows one object to contain not only properties but also other objects. In general, parsing a structure such as this is easier as the association between objects is simpler. This is an alternative to using COMP elements.
- Use brief mode. In brief mode, which is disabled by default, returns a subset of attributes of object properties. The name and type attributes are always returned. Other properties can be obtained by using the [meta](#) command with the basetype of the object. This optimization reduces the number of bytes transmitted for each request and allows caching of CLI metadata. Brief mode can be enabled or disabled by using the [set cli-parameters](#) command.

In the following example, which uses brief mode, embedded objects contain media-specific detail for ports:

```

# show ports
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE VERSION="L100" REQUEST="show ports">
  <OBJECT basetype="port" name="ports" oid="1" format="rows">
    <PROPERTY name="durable-id" type="string">hostport_A0</PROPERTY>
    <PROPERTY name="controller" key="true" type="string">A</PROPERTY>
    <PROPERTY name="controller-numeric" key="true" type="string">1</PROPERTY>
    <PROPERTY name="port" key="true" type="string">A0</PROPERTY>
    <PROPERTY name="port-type" type="string">FC</PROPERTY>
    <PROPERTY name="port-type-numeric" type="string">6</PROPERTY>
    <PROPERTY name="media" type="string">FC(-)</PROPERTY>
    <PROPERTY name="target-id" type="string">207000c0ff19331c</PROPERTY>
    <PROPERTY name="status" type="string">Disconnected</PROPERTY>
    <PROPERTY name="status-numeric" type="string">6</PROPERTY>
    <PROPERTY name="actual-speed" type="string"></PROPERTY>
    <PROPERTY name="actual-speed-numeric" type="string">255</PROPERTY>
    <PROPERTY name="configured-speed" type="string">Auto</PROPERTY>
    <PROPERTY name="configured-speed-numeric" type="string">3</PROPERTY>
    <PROPERTY name="health" type="string">OK</PROPERTY>
    <PROPERTY name="health-numeric" type="string">0</PROPERTY>
    <PROPERTY name="health-reason" type="string"></PROPERTY>
    <PROPERTY name="health-recommendation" type="string"></PROPERTY>
  <OBJECT basetype="fc-port" name="port-details" oid="2" format="rows">
    <PROPERTY name="configured-topology" type="string">PTP</PROPERTY>
    <PROPERTY name="primary-loop-id" type="string">N/A</PROPERTY>
    <PROPERTY name="sfp-status" type="string">Not present</PROPERTY>
    <PROPERTY name="sfp-present" type="string">Not Present</PROPERTY>
    <PROPERTY name="sfp-present-numeric" type="string">0</PROPERTY>
    <PROPERTY name="sfp-vendor" type="string"></PROPERTY>
    <PROPERTY name="sfp-part-number" type="string"></PROPERTY>
    <PROPERTY name="sfp-revision" type="string"></PROPERTY>
    <PROPERTY name="sfp-supported-speeds" type="string">N/A</PROPERTY>
  </OBJECT>
</OBJECT>
  ...
  <OBJECT basetype="status" name="status" oid="17">
    <PROPERTY name="response-type" type="string">Success</PROPERTY>
    <PROPERTY name="response-type-numeric" type="string">0</PROPERTY>
    <PROPERTY name="response" type="string">Command completed successfully.
(2014-07-10 14:23:23)</PROPERTY>
    <PROPERTY name="return-code" type="sint32">0</PROPERTY>
  </OBJECT>

```

```
<PROPERTY name="component-id" type="string"></PROPERTY>
<PROPERTY name="time-stamp" type="string">2014-07-10 14:23:23</PROPERTY>
<PROPERTY name="time-stamp-numeric" type="string">1405002203</PROPERTY>
</OBJECT>
</RESPONSE>
```

Command syntax

General rules for specifying commands

Command names and parameter names are not case sensitive.

Parameters enclosed in square brackets ([]) are optional. Do not type the bracket characters.

Parameter values separated by '|' characters are options. Enter only one of the values. Unless specified otherwise, enumerated values are not case sensitive.

Parameter values in italics are variables. Substitute text that is appropriate for the task you want to perform. Unless specified otherwise, variable values such as names of users and volumes are case sensitive and have a maximum length in bytes. ASCII characters are 1 byte; most Latin (Western European) characters with diacritics are 2 bytes; most Asian characters are 3 bytes.

Unless otherwise specified, a parameter value can include spaces and printable UTF-8 characters except: ", < \

A parameter value that includes a space must be enclosed in double quotes.

Parameters can be entered in any order. However, for a parameter with no keyword, if you want to specify a value that is partially or entirely the same as the keyword of an optional parameter, you must specify the optional parameter before the value. For example, to create a user named *base* you must specify the optional *base* parameter before the name **base**: `create user base 2 base`

Specifying drawers

In an enclosure with drawers:

- Disk drawers are specified by enclosure ID and drawer number. Enclosure IDs increment from 0. Drawer IDs increment from 0 in each enclosure. Example: 2.1
- Disks are specified without the drawer number, as described below.

Specifying disks

Disks are specified by enclosure ID and slot number. Enclosure IDs increment from 0. Disk IDs increment from 0 in each enclosure. You can specify:

- A disk. Example: 1.4
- A hyphenated range of disks. Example: 1.4-7
- A comma-separated list of individual disks, ranges, or both (with no spaces). Example: 1.4, 1.6-9
- For virtual storage, a RAID 10 or 50 disk group with disks in subgroups separated by colons (with no spaces). RAID-50 example: 1.1-3:1.4-6:1.7, 1.10-11
- For linear storage, a RAID 10 or 50 vdisk with disks in sub-vdisks separated by colons (with no spaces). RAID-50 example: 1.1-3:1.4-6:1.7, 1.10-11

Specifying vdisks

You can specify:

- A vdisk by its name or serial number. A unique serial number is automatically assigned when a vdisk is created, and does not change for the life of the vdisk.
- A list of vdisk names or serial numbers separated by commas (with no spaces). Not all commands support lists. List example: `vd1, "My vdisk"`

Specifying disk groups

You can specify:

- A disk group by its name or serial number.
- A list of disk-group names or serial numbers separated by commas (with no spaces). Not all commands support lists. Example: `dg1, "Disk group 1"`

Specifying pools

You can specify:

- A pool by its name or serial number.
- A list of pool names or serial numbers separated by commas (with no spaces). Not all commands support lists. Example: `A, B`

Specifying volumes

You can specify:

- A volume by its name or serial number. A unique serial number is automatically assigned when a volume is created, and does not change for the life of the volume.
- A list of volume names or serial numbers separated by commas (with no spaces). Not all commands support lists. List example: `vd1_v1, "Vol #1"`

Specifying volume groups

You can specify:

- A volume group by its name in the format `volume-group.*`, where `*` represents all volumes in the group. Example: `TestVolumes.*`

Specifying ports

Controller module host ports are specified by port number only (to use the same port in both controllers) or by controller ID and port number (to specify a port in one controller). Controller IDs are A for the upper controller and B for the lower controller, and are not case sensitive. Port IDs increment from 0 in each controller module.

You can specify:

- A port ID in both controllers. Example: `1`
- A port ID in one controller. Example: `A1`
- A hyphenated range of IDs. Do not mix controller IDs in a range. Example: `b0-b1` or `0-1`
- A comma-separated list of IDs, ranges, or both (with no spaces). Example: `A0, b0-b1` or `A0, 1`

Specifying initiators and hosts

You can specify:

- An FC initiator by its nickname or 16-hex-digit WWPN.
- A SAS initiator by its nickname or 16-hex-digit WWPN.
- An iSCSI initiator by its nickname or node name (typically the IQN).
- A host by name in the format `host-name.*`, where `*` represents all initiators in the host. Example: `FC-Server.*`

Specifying host groups

You can specify:

- A host group by name in the format `host-group.*.*`, where the first `*` represents all hosts in the group and the second `*` represents all initiators in those hosts. Example: `TestLab.*.*`

User password rules

- The value is case sensitive.
- The value can have 8-32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character. This rule does not apply if the password contains UTF-8 characters that are outside the range of printable ASCII characters.

Command completion, editing, and history

The CLI supports command completion, command editing, and command history.

When entering commands interactively you can abbreviate their names and keywords. For example, you can enter `sho cl` to run the `show cli-parameters` command. If you press Tab or Ctrl+i after typing sufficient characters to uniquely identify the command or keyword, the remainder of the command or keyword is displayed so you can confirm your intent. If you enter too few letters to uniquely identify a keyword, pressing Tab or Ctrl+i will list commands or keywords that match the entered string and redisplay the string so you can complete it.

When scripting commands, type commands in full to aid readability.

The history contains commands entered in the active CLI session. You can recall a command from the history, edit it, and run it.

Table 4 Keyboard shortcuts for command completion, editing, and history

To	Press
Complete a partially entered keyword	Tab or Ctrl+i
Show command history	F6
Get previous command from history	Up Arrow
Get next command from history	Down Arrow
Move cursor left	Left Arrow
Move cursor right	Right Arrow
Delete previous character	Backspace

Viewing help

To view brief descriptions of all commands that are available to the user role you logged in as, enter:

```
help
```

To view full help for a command name, enter:

```
help command-name
```

To view the information shown in [Command syntax](#) above, enter:

```
help syntax
```

To view the information shown in this topic and in [Command completion, editing, and history](#) above, enter:

```
help help
```

Size representations

Parameters such as names of users and volumes have a maximum length in bytes. ASCII characters are 1 byte; most Latin (Western European) characters with diacritics are 2 bytes; most Asian characters are 3 bytes.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

In the CLI, the base for entry and display of storage-space sizes can be set per user or per session; see [create user](#) and [set cli-parameters](#). When entering storage-space sizes only, either base-2 or base-10 units can be specified.

Table 5 Size representations in base 2 and base 10

Base 2		Base 10	
Unit	Size in bytes	Unit	Size in bytes
KiB (kibibyte)	1,024	KB (kilobyte)	1,000
MiB (mebibyte)	1,024 ²	MB (megabyte)	1,000 ²
GiB (gibibyte)	1,024 ³	GB (gigabyte)	1,000 ³
TiB (tebibyte)	1,024 ⁴	TB (terabyte)	1,000 ⁴
PiB (pebibyte)	1,024 ⁵	PB (petabyte)	1,000 ⁵
EiB (exbibyte)	1,024 ⁶	EB (exabyte)	1,000 ⁶

The locale setting determines the character used for the decimal (radix) point, as shown below.

Table 6 Decimal (radix) point character by locale

Language	Character	Examples
English, Chinese, Japanese, Korean	Period (.)	146.81 GB 3.0 Gb/s
Dutch, French, German, Italian, Spanish	Comma (,)	146,81 GB 3,0 Gb/s

Event log

A controller enclosure's event log records all events that have occurred in or been detected by the controller modules and encompasses all field-replaceable units (FRUs) in the storage system.

Each event has one of the following levels, in decreasing severity:

- **Critical.** A failure occurred that may cause a controller to shut down. Correct the problem *immediately*.
- **Error.** A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
- **Warning.** A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.
- **Informational.** A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.

For information about viewing events, see the [show events](#) command.

2 Categorical list of commands

Current commands by category

The following table helps you find a command within a category of functionally related commands. A command might appear in more than one category.

Table 7 Commands by category

Category	Commands
CLI and users	create user , delete user , exit , help , set cli-parameters , set password , set prompt , set user , show cli-parameters , show users
Disks, disk groups, pools, tiers, and spares	abort scrub , abort verify , add disk-group , add spares , clear disk-metadata , clear fde-keys , create vdisk , delete pools , delete vdisks , dequarantine , down disk , expand vdisk , remove spares , rescan , scrub disk-groups , scrub vdisk , set disk , set disk-group , set expander-fault-isolation , set fde-import-key , set fde-lock-key , set fde-state , set led , set pool , set vdisk , show disks , show disk-groups , show fde-state , show pools , show tiers , show vdisks , trust , verify disk-groups , verify vdisk
Volumes, volume groups, initiators, hosts, host groups and mapping	add host-group-members , add host-members , add volume-group-members , create host , create host-group , create volume , create volume-group , create volume-set , delete host-groups , delete hosts , delete initiator-nickname , delete volume-groups , delete volumes , expand disk-group , expand volume , map volume , release volume , remove disk-groups , remove host-group-members , remove host-members , remove volume-group-members , scrub volume , set cache-parameters , set host , set host-group , set host-port-mode , set initiator , set volume , set volume-group , show cache-parameters , show host-groups , show initiators , show maps , show ports , show unwritable-cache , show volume-groups , show volume-names , show volume-reservations , show volumes , unmap volume
Snapshots, and snap pools	convert master-to-std , convert std-to-master , create master-volume , create snap-pool , create snapshots , delete all-master-volumes , delete all-snapshots , delete snap-pool , delete snapshot , delete snapshot-write-data , expand snap-pool , reset snapshot , rollback volume , set priorities , set snap-pool-policy , set snap-pool-threshold , show master-volumes , show priorities , show snap-pools , show snapshots
Volume copy	abort volumecopy , show volumecopy-status , volumecopy
Scheduled tasks	create schedule , create task , delete schedule , delete task , set schedule , set task , show schedules , show tasks
Event notification	set email-parameters , set snmp-parameters , set syslog-parameters , show email-parameters , show events , show snmp-parameters , show syslog-parameters , test
System configuration and utilities	check firmware-upgrade-health , clear cache , create certificate , create chap-record , create temp-license , delete chap-records , ping , reset host-link , restart , set advanced-settings , set cache-parameters , set chap-record , set controller-date , set disk-parameters , set enclosure , set expander-fault-isolation , set expander-phy , set host-parameters , set host-port-mode , set iscsi-parameters , set led , set network-parameters , set ntp-parameters , set protocols , set system , show advanced-settings , show cache-parameters , show certificate , show chap-records , show configuration , show controller-date , show controllers , show disk-parameters , show enclosures , show expander-status , show fans , show frus , show inquiry , show iscsi-parameters , show license , show network-parameters , show ntp-status , show ports , show power-supplies , show provisioning , show protocols , show redundancy-mode , show sas-link-health , show sensor-status , show shutdown-status , show system , show system-parameters , show versions , shutdown
Service utilities	clear events , clear expander-status , fail , reset smis-configuration , restore defaults , set debug-log-parameters , set expander-fault-isolation , set expander-phy , show debug-log-parameters , show expander-status , unfail controller
API specific	meta , show refresh-counters
Remote systems	create remote-system , delete remote-system , remote , set remote-system , show remote-systems , verify links , verify remote-link

Table 7 Commands by category (continued)

Category	Commands
Remote replication	abort replication, add replication-volume, create replication-set, delete replication-set, detach replication-volume, export snapshot, reattach replication-volume, remove replication-volume, replicate snapshot, replicate volume, resume replication, set replication-primary-volume, set replication-volume-parameters, show replication-images, show replication-sets, show replication-volumes, start vdisk, stop vdisk, suspend replication
Statistics	reset all-statistics, reset controller-statistics, reset disk-error-statistics, reset disk-group-statistics, reset disk-statistics, reset host-port-statistics, reset pool-statistics, reset vdisk-statistics, reset volume-statistics, show controller-statistics, show disk-group-statistics, show disk-statistics, show host-port-statistics, show pool-statistics, show tier-statistics, show vdisk-statistics, show volume-statistics

Deprecated commands

The following table lists commands that are deprecated and specifies other commands to use instead, if any. Deprecated commands remain usable in this release but may be removed in a future release. If you have scripts that use deprecated commands, update the scripts to use the replacement commands instead.

Table 8 Deprecated commands

Deprecated command	Replacement command
add global-spare	add spares
add vdisk-spare	add spares
delete global-spare	remove spares
delete host	delete initiator-nickname
delete master-volume	delete volumes
delete vdisk-spare	remove spares
rollback master-volume	rollback volume
set auto-write-through-trigger	set advanced-settings
set awt	set advanced-settings
set global-spare	add spares
set host-name	set initiator
set job-parameters	set advanced-settings
set spares	add spares, remove spares
set storage-pool overcommit	set pool
set storage-pool	set pool
set vdisk-spare	add spares
show auto-write-through-trigger	show advanced-settings
show awt	show advanced-settings
show channels	show ports
show host-maps	show maps
show host-parameters	show ports
show hosts	show initiators
show job-parameters	show advanced-settings
show schedule-details	show schedules

Table 8 Deprecated commands (continued)

Deprecated command	Replacement command
show task-details	show tasks
show volume-maps	show maps
verify storage-pool-components	verify disk-groups
versions	show versions

Removed commands

The following table lists commands that have been removed in this release and specifies commands to use instead, if any.

Table 9 Commands removed in this release

Removed command	Replacement command
add storage-pool-components	add disk-groups
cls	None
create host-wwn-name	set initiator
create storage-pool	None
delete all-volumes	delete all-master-volumes
delete host-wwn-name	delete initiator-nickname
delete iscsi-host	delete initiator-nickname
delete storage-pool	delete pools
delete vdisk	delete vdisks
history	None
remove storage-pool-components	remove disk-groups
reset host-channel-link	reset host-link
reset snap-pool	None
scrub disk	None
scrub storage-pool-components	None
set drive-parameters	set disk-parameters
set host-wwn-name	set initiator
set iscsi-host	set initiator
set output-format	set cli-parameters
set snap-pool-parameters	None
set snapshot-policy	None
show drive-parameters	show disk-parameters
show enclosure-status	show enclosures, show frus, show sensor-status
show host-wwn-names	show initiators
show output-format	show cli-parameters
show port-wwn	show ports
show storage-pool-components	show disk-groups

Table 9 Commands removed in this release (continued)

Removed command	Replacement command
show storage-pools	show pools
show storage-status	show disk-group-statistics
show volume copy-status	show volumecopy-status
stty	None
tInfo	None

The following table lists commands that were removed in previous releases and specifies commands to use instead, if any.

Table 10 Commands removed in previous releases

Removed command	Replacement command
clear disk metadata	clear disk-metadata
create host-name	set initiator
create iscsi-host	set initiator
echo	None
exec	None
expand master-volume	expand volume
set host-port-interconnects	None – not applicable to RPC24 694xx Series
set replication-external-view	set replication-primary-volume
set snap-pool policy	set snap-pool-policy
set snap-pool threshold	set snap-pool-threshold
show host-port-interconnects	None – not applicable to RPC24 694xx Series
show iscsi-hosts	show initiators
show lun-maps	show maps

3 Alphabetical list of commands

This chapter is organized to help you find a command by name. Each command topic includes one or more of the following sections:

Description The command's purpose and notes about its usage

Min. role The minimum user role required to use the command

Syntax The command's syntax

Parameters Descriptions of the command's parameters

Output Descriptions of fields shown in console format

Example One or more examples of the command's usage in console format

Basetypes References to descriptions of basetype properties shown in XML API format

See also References to commands that are used with the command

abort replication

Description Aborts the current replication operation for the specified secondary volume. This command applies to linear storage only.

The current replication may be running or suspended. This command must be issued on the system that owns the secondary volume.

Min. role manage

Syntax abort replication
 [set *replication-set*]
 replication-volume

Parameters set *replication-set*
Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

replication-volume
The name or serial number of the secondary volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the set parameter.

Example Abort replication of primary volume V1 to secondary volume rV1.

```
# abort replication rV1
```

See also

- [resume replication](#)
- [suspend replication](#)
- [show replication-sets](#)
- [show replication-volumes](#)

abort scrub

Description Aborts a media scrub operation. You can abort scrub of specified disk groups, vdisks, or volumes.

Min. role manage

Syntax `abort scrub`
 `[disk-group disk-groups]`
 `[vdisk vdisks]`
 `[volume volumes]`

Parameters Specify only one of the following parameters.

`disk-group disk-groups`

Optional. A comma-separated list of the names or serial numbers of the disk groups to stop scrubbing. A name that includes a space must be enclosed in double quotes.

`vdisk vdisks`

Optional. A comma-separated list of the names or serial numbers of the vdisks to stop scrubbing. A name that includes a space must be enclosed in double quotes.

`volume volumes`

Optional. A comma-separated list of the names or serial numbers of the volumes to stop scrubbing. A name that includes a space must be enclosed in double quotes.

Example Abort scrubbing disk group dg1.

```
# abort scrub disk-group dg1
```

Abort scrubbing vdisk vd1.

```
# abort scrub vdisk vd1
```

Abort scrubbing volume vol1.

```
# abort scrub volume vol1
```

- See also**
- [scrub disk-groups](#)
 - [scrub vdisk](#)
 - [scrub volume](#)
 - [show disk-groups](#)
 - [show vdisks](#)
 - [show volumes](#)

abort verify

Description Aborts a media verify operation. You can abort verification of specified disk groups or vdisks.

Min. role manage

Syntax `abort verify`
 `[disk-group disk-groups]`
 `[vdisk vdisks]`

Parameters `disk-group disk-groups`
Optional. A comma-separated list of the names or serial numbers of the disk groups to stop verifying. A name that includes a space must be enclosed in double quotes.

`vdisk vdisks`
Optional. A comma-separated list of the names or serial numbers of the vdisks to stop verifying. A name that includes a space must be enclosed in double quotes.

Example Abort verifying disk group dg1.

```
# abort verify disk-group dg1
```

Abort verifying vdisk vd1.

```
# abort verify vdisk vd1
```

See also

- [show disk-groups](#)
- [show vdisks](#)
- [verify disk-groups](#)
- [verify vdisk](#)

abort volumecopy

Description Aborts copying a volume. This command applies to linear storage only.

When the abort is complete, the destination volume is deleted.

Min. role manage

Syntax `abort volumecopy
volume`

Parameters *volume*

The name or serial number of the source volume, the destination volume, or if a snapshot is being copied, its associated master volume. A name that includes a space must be enclosed in double quotes.

Example Abort creating destination volume `vd1_copy`.

```
# abort volumecopy v1_copy
```

See also


- [show volumecopy-status](#)
- [show volumes](#)
- [volumecopy](#)


add disk-group

Description Creates a linear disk group or a virtual or read-cache disk group (with the Virtualization license) using specified disks.

All disks in a group must be the same type (enterprise SAS, for example). A group of midline SAS disks can be used in the Archive tier. A group of enterprise SAS disks can be used in the Standard tier. A group of SAS SSDs can be used either in the Performance tier (with the Performance tier license) or as read cache. A virtual pool can contain only one read-cache group. A virtual pool cannot contain both read cache and a Performance tier. At least one virtual group must exist before a read-cache group can be added. A read-cache disk group can contain a maximum of two disks.

When you add a virtual disk group, the system will first prepare the group to be added to a virtual pool. During preparation, the group's status will be VPREP and the group cannot be removed. When preparation is complete, the group will start initializing. During initialization, the group's status will be INIT and the group will be available to store user data—or the group can be removed.

 **TIP:** All virtual groups in the same tier within a virtual pool should have the same RAID level. This will provide consistent performance across the tier.

 **TIP:** To replace a single-disk read-cache group with a multiple-disk read-cache group, simply remove the read cache and re-add it.

Min. role manage

Syntax `add disk-group`
 `[assigned-to a|b|auto]`
 `[chunk-size 16k|32k|64k|128k|256k|512k]`
 `disks disks`
 `[level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10|raid50|r50]`
 `[mode online|offline]`
 `[pool a|b]`
 `[spare disks]`
 `type linear|virtual|read-cache`
 `[name]`

Parameters `assigned-to a|b|auto`

Optional for a linear group; prohibited for a virtual or read-cache group. For a system operating in Active-Active ULP mode, this specifies the controller module to own the group. To let the system automatically load-balance groups between controller modules, use `auto` or omit this parameter. In Single Controller mode, this parameter is ignored; the system automatically load-balances groups in anticipation of the insertion of a second controller in the future.

`chunk-size 16k|32k|64k|128k|256k|512k`

Optional for a linear group; prohibited for a virtual or read-cache group. Specifies the amount of contiguous data, in KB, that is written to a group member before moving to the next member of the group. For NRAID and RAID 1, `chunk-size` has no meaning and is therefore not applicable. For RAID 50, this option sets the chunk size of each RAID-5 subgroup. The chunk size of the RAID-50 group is calculated as: *configured-chunk-size* x (*subgroup-members* - 1)

For a linear group, the default is 512k. For a virtual group, the default is 512k with the following exception: for a RAID-5 or RAID-6 group with a non-power-of-two data disks (for example, 7 data disks and 2 parity disks), the size will be 64k.

disks disks

Specifies the IDs of the disks to include in the group. For disk syntax, see ["Command syntax" \(page 23\)](#).

The minimum and maximum numbers of disks supported for each RAID level are:

- **NRAID:** 1
- **RAID 0:** 2–16
- **RAID 1:** 2
- **RAID 3:** 3–16
- **RAID 5:** 3–16
- **RAID 6:** 4–16
- **RAID 10:** 4–16
- **RAID 50:** 6–32

RAID 10 requires a minimum of two RAID-1 subgroups each having two disks. RAID 50 requires a minimum of two RAID-5 subgroups each having three disks. NRAID is automatically used for a read-cache group with a single disk. RAID 0 is automatically used for a read-cache group with multiple disks.

`level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10|raid50|r50`

Required for a linear or virtual group; prohibited for a read-cache group. Specifies the RAID level to apply to the member disks. Fault-tolerant RAID levels are RAID 1, 3, 5, 6, 10, and 50. A linear group can use any RAID level. A virtual group can use only RAID 1, 5, 6, or 10.

`mode online|offline`

Optional for a linear group; prohibited for a virtual or read-cache group. Specifies whether the group is initialized online or offline.

- **online:** Enables you to use the group immediately after creating it while it is initializing. Because online uses the verify method to create the group, it takes longer to complete initializing than offline. Online initialization is fault-tolerant. This option is the default.
- **offline:** You must wait for the group initialization process to finish before using the group. However, offline takes less time to complete initializing than online. This mode is always used for virtual groups.

`pool a|b`

Required for a virtual or read-cache group; prohibited for a linear group. Specifies the name of the virtual pool to contain the group. If the pool does not already exist, it will be created.

spare disks

Optional for a linear group; prohibited for a virtual or read-cache group. Specifies the IDs of 1–4 dedicated spares to assign to a RAID 1, 3, 5, 6, 10, or 50 group. For disk syntax, see ["Command syntax" \(page 23\)](#). Only global spares are used for virtual groups.

`type linear|virtual|read-cache`

Required. Specifies the type of group to create.

- **linear:** A disk group for linear storage.
- **virtual:** A disk group for virtual storage.
- **read-cache:** A disk group for use as read cache for a virtual pool.

`name`

Optional for a virtual or read-cache group; required for a linear group. Specifies a name for the new group. The name must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

If this parameter is omitted, the system will generate the name `dgcontroller-ID#` where # starts at 0 for a virtual group, or `rccontroller-ID` for a read-cache group.

Example Add linear, RAID-1 disk group `dg1` with one spare.

```
# add disk-group type linear disks 1.20-21 level r1 spare 1.22 dg1
```

Add virtual, RAID-5 disk group dg2 to pool A.

```
# add disk-group type virtual disks 1.17-19 level r5 pool a
```

Add a read-cache disk group to pool B. The resulting group will be named rcB.

```
# add disk-group type read-cache disks 1.18-19 pool b
```

- See also
- [expand disk-group](#)
 - [remove disk-groups](#)
 - [set disk-group](#)
 - [show disk-groups](#)
 - [show disks](#)

add global-spare (Deprecated)

Use [add spares](#).

add host-group-members

Description Adds hosts to a host group. A host group can contain a maximum of 256 hosts.

To add a host to a host group, the host must have the same mappings as all other members of the group. This means that the host must be mapped with the same access, port, and LUN settings to the same volumes or volume groups.

Min. role manage

Syntax `add host-group-members
hosts hosts
host-group`

Parameters `hosts hosts`

A comma-separated list of the names of hosts to add to the specified host group. A name that includes a space must be enclosed in double quotes.

`host-group`

The name of an existing host group.

Example Add existing hosts Host3 and Host4 to existing host group HostGroup1.

```
# add host-group-members hosts Host3,Host4 HostGroup1
```

See also

- [remove host-group-members](#)
- [show host-groups](#)
- [show initiators](#)

add host-members

Description Adds initiators to a host. A host can contain a maximum of 128 initiators.

To add an initiator to a host, the initiator must have the same mappings as all other initiators in the host. This means that the initiator must be mapped with the same access, port, and LUN settings to the same volumes or volume groups.

Min. role manage

Syntax add host-members
 initiators *initiators*
 host-name

Parameters *initiators* *initiators*
A comma-separated list of the nicknames or IDs of initiators to add to the specified host. A name that includes a space must be enclosed in double quotes.

host-name

The name of an existing host.

Example Add existing initiators Init3 and Init4 to existing host Host1.

```
# add host-members initiators Init3,Init4 Host1
```

See also

- [create host](#)
- [remove host-group-members](#)
- [show host-groups](#) (and hosts)
- [show initiators](#)

add replication-volume

Description Adds an existing secondary volume to a replication set. This command applies to linear storage only.

The volume can be in the same system as the primary volume or in a remote system.

A secondary volume is a master volume created specifically for use as the destination for a replication by using the `create master-volume` command's `prepare-replication-volume` parameter.

Secondary volumes serve as the destination for replicated data from the primary volume. When a `replicate snapshot` or `replicate volume` command is issued, data is replicated from the primary volume to the associated secondary volume in the replication set.

This command must be run on the primary system.

Min. role manage

Syntax `add replication-volume`
`link-type FC|iSCSI`
`[max-queue #]`
`[nowait]`
`primary-volume volume`
`[priority low|medium|high]`
`[remote-system system]`
`secondary-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs`
`[set replication-set]`
`replication-volume`

Parameters `link-type FC|iSCSI`

Specifies the type of ports being used for the inter-system link:

- `FC`: FC ports
- `iSCSI`: iSCSI ports

`max-queue #`

Optional. The number of replication images to consider when determining the next image to replicate: 1–64. Used only if the `on-collision` parameter is set to `oldest`.

`nowait`

Optional. Adding a volume to a replication set can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands.

`primary-volume volume`

The name or serial number of the replication volume to be the primary volume for the replication set. A name that includes a space must be enclosed in double quotes.

`priority low|medium|high`

Optional. The priority of the replication process on the replication volume: low, medium, or high.

`remote-system system`

Optional for a local volume; required for a remote volume if the `secondary-address` parameter is not specified. The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

`secondary-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs`

Optional for a local volume; required for a remote volume if the `remote-system` parameter is not specified. Specifies host ports in the remote system by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, `10.134.2.1:3260`. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

replication-volume

The name or serial number of the secondary volume to add. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Add secondary volume MV2 to the replication set whose primary volume is MV1, set the replication priority to high, and allow a maximum of 2 queued images to be considered for replication.

```
# add replication-volume link-type FC secondary-address  
wwpn=207000c0ffd52c31,217000c0ff52c31 primary-volume MV1 priority high max-queue  
2 MV2
```

Add secondary volume `LosAngeles` to a replication set that uses iSCSI links and whose primary volume is `NewYork`.

```
# add replication-volume LosAngeles primary-volume NewYork link-type iSCSI  
secondary-address ip=10.134.69.5,10.134.69.6
```

See also

- [show replication-sets](#)
- [show replication-volumes](#)

add spares

Description Designates specified available disks to be spares. A spare can replace a failed disk of the same type (enterprise SAS, for example) and the same or lower capacity in a disk group with a fault-tolerant RAID level (1, 3, 5, 6, 10, 50).

For linear storage, you can add global spares or dedicated spares:

- A global spare is available to any fault-tolerant vdisk with the same disk type. The system can have 16 global spares.
- A dedicated spare is assigned to a fault-tolerant vdisk with the same disk type. A vdisk can have 4 dedicated spares.

For virtual storage, all spares are global spares. A global spare is available to any fault-tolerant vdisk with the same disk type. The system can have 16 global spares.

For information about sparing rules, see the “About spares” topic in the Storage Management Guide.

Min. role manage

Syntax `add spares`
 `[disk-group disk-group]`
 `[vdisk vdisk]`
 `disks`

Parameters `disk-group disk-group`

Optional. The name or serial number of a linear disk group to assign the disks to as dedicated spares. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, the disks will be global spares.

`vdisk vdisk`

Optional. The name or serial number of the vdisk to assign the disks to as dedicated spares. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, the disks will be global spares.

`disks`

The IDs of the disks to designate as spares. For disk syntax, see "[Command syntax](#)" (page 23).

Example Designate disk 1.2 as a global spare.

```
# add spares 1.2
```

Designate disk 1.3 as a dedicated spare for vdisk VD1.

```
# add spares vdisk VD1 1.3
```

Designate disk 1.3 as a dedicated spare for linear disk group dg1.

```
# add spares disk-group dg1 1.3
```

See also

- [remove spares](#)
- [show disk-groups](#)
- [show disks](#)
- [show vdisks](#)

add vdisk-spare (Deprecated)

Use [add spares](#).

add volume-group-members

Description Adds virtual volumes to a volume group.

To add a volume to a volume group, the volume must have the same mappings as all other members of the group. This means that the volume must be mapped with the same access, port, and LUN settings to the same initiators, hosts, or host groups.

Min. role manage

Syntax add volume-group-members
volumes *volumes*
volume-group

Parameters volumes *volumes*

A comma-separated list of the names or serial numbers of virtual volumes to add to the specified volume group. A name that includes a space must be enclosed in double quotes.

volume-group

The name of an existing volume group. A name that includes a space must be enclosed in double quotes.

Example Add existing volumes Vol0002 and Vol0003 to existing volume group VolumeGroup1.

```
# add volume-group-members volumes Vol0002,Vol0003 VolumeGroup1
```

See also

- [create volume-group](#)
- [remove volume-group-members](#)
- [show volume-groups](#)
- [show volumes](#)

check firmware-upgrade-health

Description Checks that the system is ready for a firmware upgrade.

Under normal conditions, firmware upgrade can be performed safely without risk to data availability or integrity. However, when the system is degraded—for example, because of failed or missing components or lack of multi-pathing to disks—upgrade failure or loss of availability can occur.

This command performs a series of health checks to determine whether any conditions exist that need to be resolved before upgrading firmware. Any conditions that are detected are listed with their potential risks. You can use commands in the “See also” section to determine which components have health problems to be resolved.

For information about using the WBI or FTP to update firmware, see the Storage Management Guide.

Min. role manage

Syntax `check firmware-upgrade-health`

Output Upgrade Health

- **Pass:** There are no risks to performing firmware upgrade.
- **Fail:** At least one condition exists that presents a risk of upgrade failure or loss of availability.

Condition Detected
The condition that was detected.

Risks
The problems that are likely to result if you do not resolve the conditions before performing a firmware upgrade.

Example Check firmware upgrade health for a system that is ready for upgrade.

```
# check firmware-upgrade-health
Upgrade Health
-----
Pass
-----
Success: Command completed successfully. (2014-06-07 15:14:33)
```

Check firmware upgrade health for a system that has problems to be resolved before upgrade.

```
# check firmware-upgrade-health
```

```
Upgrade Health
```

```
-----
```

```
Fail
```

```
Condition Detected
```

```
Risks
```

```
-----
```

```
One or more disks are currently single ported.
```

```
Data unavailability
```

```
At least one controller is not up.
```

```
Data unavailability
```

```
One or more temperature sensors indicate a critical temperature.
```

```
Code load failure
```

```
At least one controller contains unwritten cache data.
```

```
Data corruption, data loss
```

```
One or more supercapacitors have failed.
```

```
Code load failure
```

```
One or more power supplies are not functioning.
```

```
Code load failure
```

```
One or more fans are not functioning.
```

```
Code load failure
```

```
-----
```

```
Success: Command completed successfully. (2014-06-7 17:13:07)
```

- Basetypes
- [code-load-readiness](#)
 - [code-load-readiness-reasons](#)
 - [status](#)

- See also
- [show controllers](#)
 - [show disks](#)
 - [show enclosures](#)
 - [show fans](#)
 - [show power-supplies](#)
 - [show sensor-status](#)
 - [show system](#)

clear cache

Description Clears unwritable cache data from both controllers. This data cannot be written to disk because it is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume's disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host and disk. Unwritable cache is also called orphan data.

△ **CAUTION:** Only use this command when all disk groups are online. Improper use of this command may result in data loss.

You can clear unwritable cache data for a specified volume or for all volumes.

Min. role manage

Syntax `clear cache`

Syntax `clear cache`
`[volume volume]`

Parameters `volume volume`

Optional. The name or serial number of a specific volume for which to clear unwritable cache data. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, unwritable cache data is cleared for all volumes.

Example Clear unwritable cache data for volume V1 from both controllers.

```
# clear cache volume v1
```

See also

- [show unwritable-cache](#)
- [show volumes](#)

clear disk-metadata

Description Clears metadata from leftover disks. For a leftover disk, the [show disks](#) command shows the Usage value LEFTOVR.

△ CAUTION:

- Only use this command when all vdisks are online and leftover disks exist. Improper use of this command may result in data loss.
 - Do not use this command when a vdisk is offline and one or more leftover disks exist.
-

If you are uncertain whether to use this command, contact technical support for further assistance.

Each disk in a vdisk has metadata that identifies the owning vdisk, the other members of the vdisk, and the last time data was written to the vdisk. The following situations cause a disk to become a *leftover*:

- Vdisk members' timestamps do not match so the system designates members having an older timestamp as leftovers.
- A disk is not detected during a rescan, then is subsequently detected.

When a disk becomes a leftover, the following changes occur:

- The disk's health becomes `Degraded` and its How Used state becomes `LEFTOVR`.
- The disk is automatically excluded from the vdisk, causing the vdisk's health to become `Degraded` or `Fault`, depending on the RAID level.
- For a 2U48 enclosure, the disk's fault LED becomes illuminated.

If spares are available, and the health of the vdisk is `Degraded`, the vdisk will use them to start reconstruction. When reconstruction is complete, you can clear the leftover disk's metadata. Clearing the metadata will change the disk's health to `OK` and its How Used state to `AVAIL`, making the disk available for use in a new vdisk or as a spare.

If spares are not available to begin reconstruction, or reconstruction has not completed, keep the leftover disk so that you'll have an opportunity to recover its data.

This command clears metadata from leftover disks only. If you specify disks that are not leftovers, the disks are not changed.

Min. role `manage`

Syntax `clear disk-metadata`
`disks`

Parameters `disks`

The IDs of the leftover disks from which to clear metadata. For disk syntax, see "[Command syntax](#)" ([page 23](#)).

Example Clear metadata from leftover disk1 . 1.

```
# clear disk-metadata 1.1
```

See also • [show disks](#)

clear events

Description Clears the event log in controller A, B, or both. For use by or with direction from technical support.

Min. role manage

Syntax `clear events`
`[a|b|both]`

Parameters `a|b|both`
Optional. The controller event log to clear. If this parameter is omitted, both event logs are cleared.

Example Clear the event log for controller A.

```
# clear events a
```

See also • [show events](#)

clear expander-status

Description Clears the counters and status for SAS expander lanes. For use by or with direction from technical support. Counters and status can be reset to a good state for all enclosures, or for a specific enclosure whose status is Error as shown by the [show expander-status](#) command.

NOTE: If a rescan is in progress, the clear operation will fail with an error message saying that an EMP does exist. Wait for the rescan to complete and then retry the clear operation.

Min. role manage

Syntax `clear expander-status`
 [enclosure *ID*]

Parameters *enclosure ID*
Optional. The enclosure number. If this parameter is omitted, the command clears the counters and status of all enclosures.

Example Clear the expander status for the enclosure with ID 1.

```
# clear expander-status enclosure 1
```

See also • [show expander-status](#)

clear fde-keys

Description Removes the lock keys used with Full Disk Encryption.

You can use this command to temporarily deny access to data on the disks during a period when the system will not be under your physical control. If the lock keys are cleared while the system is secured, the system will enter the `Secured, Lock Ready` state, in preparation for the system being powered down and transported. The disks will still be in the `Secured, Unlocked` state. After the system has been transported and powered back up, the system and disks will be in the `Secured, Locked` state. Set the system's lock key to restore access to data.

Min. role `manage`

Syntax `clear fde-keys`
`[current-passphrase value]`

Parameters `current-passphrase value`

Optional. If the system is currently secured, you can provide the current passphrase as part of the command. If this parameter is omitted, the command will prompt you for the current passphrase.

Example Clear the lock keys in preparation for shipping a system to a new location.

```
# clear fde-keys
Please enter the current passphrase to confirm. myPassphrase
```

See also

- [set fde-import-key](#)
- [set fde-lock-key](#)
- [set fde-state](#)
- [show fde-state](#)

convert master-to-std

Description Converts a specified master volume into a standard volume. This command applies to linear storage only. This disables snapshot functionality for the volume. If the specified volume has associated snapshots, you must delete the snapshots before converting the volume.

Min. role `manage`

Syntax `convert master-to-std
master-volume`

Parameters *master-volume*
The name or serial number of the master volume to convert. A name that includes a space must be enclosed in double quotes.

Example Convert a master volume having no snapshots to a standard volume.

```
# convert master-to-std MV1
```

See also

- [delete all-snapshots](#)
- [show master-volumes](#)

convert std-to-master

Description Converts a standard volume to a master volume. This command applies to linear storage only.

This enables snapshot functionality for the volume and associates it with an existing snap pool. The standard volume and the snap pool must be owned by the same controller, though they can be in different vdisks.

Min. role manage

Syntax `convert std-to-master
snap-pool snap-pool
standard-volume`

Parameters `snap-pool snap-pool`

The name or serial number of the snap pool to associate with the new master volume. A name that includes a space must be enclosed in double quotes.

`standard-volume`

The name or serial number of the standard volume to convert. A name that includes a space must be enclosed in double quotes.

Example Convert standard volume V1 to a master volume and associate it with snap pool SP1.

```
# convert std-to-master snap-pool SP1 V1
```

See also

- [show snap-pools](#)
- [show volumes](#)

create certificate

Description Creates or removes a custom security certificate.

The storage system supports use of unique certificates for secure data communications, to authenticate that the expected storage systems are being managed. Use of authentication certificates applies to the HTTPS protocol, which is used by the web server in each controller module. The WBI and SMI-S interfaces use the same certificate.

After using this command you must restart the system's Management Controllers to have the change take effect.

Min. role manage

Syntax `create certificate`
`[a|b|both]`
`[contents content-string]`
`[noprompt]`
`[restore]`
`[unique]`

Parameters `a|b|both`

Optional. Specifies whether to apply the change to controller A, B, or both. If this parameter is omitted, the change is applied to the controller being accessed.

`contents content-string`

Optional. A security certificate is generated based on the supplied content. The content becomes the subject of the certificate creation request and must be formatted as

`/type0=value0/type1=value1/type2=...`, where types include CO for country, ST for state or province, L for location, CN for common name, and O for organization. The content string cannot exceed 1024 characters and can include printable UTF-8 characters except space or semicolon. An example is `/CO=US/ST=CO/O=MyOrganization/CN=www.mysite.com`. You must specify either this parameter or the `restore` parameter or the `unique` parameter.

`noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a response. Specifying this parameter allows the command to proceed without user interaction.

`restore`

Optional. The system-generated certificate is restored and the custom certificate is discarded. The custom certificate may have been created with this CLI command or uploaded using FTP. You must specify either this parameter or the `contents` parameter or the `unique` parameter.

`unique`

Optional. A security certificate is generated based on the system's serial number and other standard values. This certificate is installed, and the original certificate is archived. You must specify either this parameter or the `contents` parameter or the `restore` parameter.

Example Regenerate the system certificate with a new private key.

```
# create certificate unique
```

Create a custom certificate using a content string.

```
# create certificate contents /CO=US/ST=CO/L=NewYork/O=MyCompany/CN=www.mycompany.com
```

Restore the system-generated certificate and remove the custom certificate.

```
# create certificate restore
```

See also

- [restart](#) (with the parameters `mc` and `both`)
- [show certificate](#)

create chap-record

Description For iSCSI, creates a CHAP record to authenticate login requests. When CHAP is enabled, the record enables authentication between the originator (initiator) and recipient (target) of a login request. This command is permitted whether or not CHAP is enabled.

The CHAP record can specify one name-secret pair to authenticate the originator only (one-way CHAP) or two pairs to authenticate both the originator and the recipient (mutual CHAP).

For a login request from an iSCSI host to a storage system, the host is the originator and the storage system is the recipient.

Min. role manage

Syntax `create chap-record`
`name originator-name`
`secret originator-secret`
`[mutual-name recipient-name mutual-secret recipient-secret]`

Parameters `name originator-name`

The originator name, typically in IQN format. The name is case sensitive and can have a maximum of 223 bytes, including 0–9, lowercase a–z, hyphen, colon, and period.

`secret originator-secret`

The secret that the recipient uses to authenticate the originator. The secret is case sensitive and can include 12–16 bytes.

`mutual-name recipient-name`

Optional; for mutual CHAP only. The recipient name, typically in IQN format. The name is case sensitive and can have a maximum of 223 bytes, including 0–9, lowercase a–z, hyphen, colon, and period. To determine a storage system's IQN, use the [show ports](#) command to view an iSCSI port Target ID value. This parameter and `mutual-secret` must be set together.

`mutual-secret recipient-secret`

Optional; for mutual CHAP only. The secret that the originator uses to authenticate the recipient. The secret is case sensitive, can include 12–16 bytes, and must differ from the originator secret. A storage system's secret is shared by both controllers. This parameter and `mutual-name` must be set together.

Example Create a one-way CHAP record to enable a storage system to authenticate a host initiator.

```
# create chap-record name iqn.1991-05.com.microsoft:myhost.domain secret  
123456abcDEF
```

See also

- [delete chap-records](#)
- [set chap-record](#)
- [show chap-records](#)
- [show iscsi-parameters](#)
- [show ports](#)

create host

Description Creates a host with an associated name.

In earlier firmware versions, a *host* represented a single external port in a server or switch to which a controller module is connected. Now, such a port is an *initiator* and a *host* is a group of initiators (for example, a server containing a number of ports).

You can use the `create host` command to create a host that groups together specified initiators, and optionally to add the host to a host group. You can create a maximum of 512 hosts, each containing a maximum of 128 initiators.

To create a single initiator, use the [set initiator](#) command.

Min. role `manage`

Syntax `create host`
`[host-group host-group]`
`[initiators initiators]`
`name`

Parameters `host-group host-group`

Optional. The name of an existing host group to which to add the new host.

`initiators initiators`

A comma-separated list of initiator nicknames, IDs, or both, with no spaces. For FC or SAS the ID is a WWPN. A WWPN can include a colon between each byte but the colons will be discarded. For iSCSI the ID is an IQN.

`name`

A name for the host. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create host `Host1` that includes two FC initiators.

```
# create host initiators 10000090fa13870e,10000090fa13870f Host1
```

Create host `Host2` that includes two iSCSI initiators.

```
# create host initiators iqn.1992-01.com.example:storage.host2.port1,
iqn.1992-01.com.example:storage.host2.port2 Host2
```

Create host `Host4` by pasting a WWPN that includes colons.

```
# create host initiators 20:70:00:c0:ff:d7:4c:07 Host4
```

- See also**
- [set host](#)
 - [set initiator](#)
 - [show host-groups](#)
 - [show initiators](#)

create host-group

Description Creates a host group that includes specified hosts. You can create a maximum of 32 host groups, each containing a maximum of 256 hosts.

Min. role manage

Syntax `create host-group
hosts hosts
host-group`

Parameters `hosts hosts`

A comma-separated list of the names of hosts to include in the host group. A name that includes a space must be enclosed in double quotes.

`host-group`

A name for the host group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create a host group named HostGroup1 that includes hosts Host1 and Host2.

```
# create host-group hosts Host1,Host2 HostGroup1
```

- See also**
- [add host-group-members](#)
 - [delete host-groups](#)
 - [remove host-group-members](#)
 - [set host-group](#)
 - [show host-groups](#)

create master-volume

Description Creates a volume that is enabled for snapshots. This command applies to linear storage only.

The master volume is created in a specified vdisk and is associated with a specified snap pool. You can either associate the master volume with an existing snap pool owned by the same controller, or optionally specify the size of a new snap pool to automatically create. The vdisk and snap pool must be owned by the same controller.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

For use with remote replication, you can create a replication-prepared volume that is intended to be added to a replication set as its secondary volume. A secondary volume cannot be assigned a LUN or mapped to hosts.

Min. role manage

Syntax create master-volume
[lun *LUN*]
[prepare-replication-volume]
[reserve size [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]
size *size* [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
[snap-pool *snap-pool*]
vdisk *vdisk*
name

Parameters lun *LUN*

Optional. A default LUN to assign to the new, regular master volume. If this parameter is omitted, no LUN is assigned. Use either this parameter or the prepare-replication-volume parameter.

prepare-replication-volume

Optional. Specifies to create a replication volume instead of a regular master volume. Use either this parameter or the lun parameter.

reserve *size* [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Optional. The size of the snap pool to create in the vdisk. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks. The default size is either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Use either this parameter or the snap-pool parameter.

size *size* [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Sets the volume size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

snap-pool *snap-pool*

Optional. Name or serial number of the snap pool to associate with the new master volume. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, the system automatically creates a snap pool that is either 20% of the master volume's size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Use either this parameter or the reserve parameter.

vdisk *vdisk*

The name or serial number of the vdisk to create the volume in. A name that includes a space must be enclosed in double quotes.

name

A name for the new master volume. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create the 20-GB master volume MV1 on vdisk VD1, and associate it with snap pool SP1.

```
# create master-volume vdisk VD1 size 20GB snap-pool SP1 lun 3 MV1
```

Create the 50-GB replication volume MV2 on vdisk VD1, and automatically create an associated 20-GB snap pool.

```
# create master-volume vdisk VD1 size 50GB prepare-replication-volume reserve 20GB MV2
```

See also

- [show master-volumes](#)
- [show snap-pools](#)
- [show vdisks](#)

create remote-system

Description Creates a persistent association with a remote storage system. This command applies to linear storage only.

This allows a local system to track remote systems by their network-port IP addresses and cache their login credentials. The IP address you specify is used to connect to the remote system and obtain information such as the system name and both controllers' IP addresses. You can then use the system name or an IP address in commands that need to interact with the remote system.

Min. role `manage`

Syntax `create remote-system
password password
username username
system`

Parameters `password password`
The password for that user.

`username username`

The name of a user in the remote system. This must be a user with the `manage` role to remotely configure or provision that system.

`system`

The network-port IP address of the remote system.

Example Create a remote system.

```
# create remote-system username manage password !manage 10.122.1.21
```

See also

- [delete remote-system](#)
- [remote](#)
- [set remote-system](#)
- [show remote-systems](#)

create replication-set

Description Creates a replication set from a specified standard or master volume. This command applies to linear storage only.

If you specify a standard volume, it is converted to a master volume using default policies for snap-pool creation. You can optionally use the `reserve` parameter to set the snap-pool size. The specified volume becomes the replication set's primary volume.

You can specify a remote volume to be the replication set's secondary volume, or one will be created. When a [replicate snapshot](#) or [replicate volume](#) command is issued, data in the primary volume is replicated to the associated secondary volume.

You can associate the primary volume with a remote system in the following ways:

- If the local and remote MCs cannot communicate, you must use the `secondary-address` parameter to specify the remote system, and you must use the `remote-volume` parameter to specify the serial number of an existing replication-prepared volume in the remote system to be the secondary volume.
- If the local and remote MCs can communicate and the remote system is defined in the local system, you can do one of the following:
 - Use the `remote-volume` parameter to specify the name or serial number of a replication-prepared volume to use as a secondary volume. If the remote volume is in a remote system, also use the `remote-system` parameter. If you want to limit replication to specific host ports, also use the `secondary-address` parameter.
 - Use the `remote-vdisk` parameter to specify the name or serial number of the vdisk in which to create the remote volume and snap pool.

You can also start the initial replication by specifying the `snapshot` parameter.

If you create a replication set without specifying a replication destination, a partial set is created and you must use the [add replication-volume](#) command to complete the set before you can perform replication.



IMPORTANT: Before starting this procedure, if you intend to use CHAP to authenticate iSCSI login requests between the local system and a remote system, do the following:

- Create a one-way CHAP record on each system. On the local system, the CHAP record must refer to the node name of the remote system. On the remote system, the CHAP record must refer to the node name of the local system. Both records must use the same secret. (Mutual CHAP is not used between storage systems. CHAP records' mutual fields can be set but are not used.) To create a CHAP record, use the [create chap-record](#) command.
- After the CHAP records are created, enable CHAP on the primary system, the secondary system, or both. To enable CHAP, use the [set iscsi-parameters](#) command.

If both records don't exist or don't use the same secret, replication-set creation will fail.

If the create transaction fails, a prompt asks if you want to revert the transaction, which undoes any changes made in attempting to create the replication set. To revert, enter `yes`; otherwise, enter `no`.

Replication within the same system is allowed only if the primary and secondary volumes are in vdisks owned by different controllers.

Min. role `manage`

Syntax `create replication-set`
`[link-type FC|iSCSI]`
`[max-queue #]`
`[noprompt]`
`[nowait]`
`[primary-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs]`
`[priority low|medium|high]`
`[remote-storage-pool pool]`
`[remote-system system]`
`[remote-vdisk vdisk]`
`[remote-volume volume]`
`[reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]`
`[secondary-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs]`
`[set name]`
`[snapshot snapshot]`
`primary-volume`

Parameters `link-type FC|iSCSI`

Optional; required if the `primary-address` parameter is *not* specified. Specifies the type of ports being used for the inter-system link:

- FC: FC ports.
- iSCSI: iSCSI ports.

`max-queue #`

Optional. The number of replication images to consider when determining the next image to replicate: 1–64. Used only if the `on-collision` parameter is set to `oldest`.

`noprompt`

Optional in console format; required for XML API format. Suppresses the prompt to revert the transaction if the command fails, which requires a yes or no response. If this parameter is specified and the command fails, the transaction is automatically reverted.

`nowait`

Optional. Adding a volume to a replication set can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands. You cannot specify both the `nowait` parameter and the `snapshot` parameter.

`primary-address ip=address|wwnn=WWNNs|wwpn=WWPNs`

Optional. Specifies host ports in the local system by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, `10.134.2.1:3260`. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`priority low|medium|high`

Optional. The priority of the replication process for the replication volumes: low, medium, or high.

`remote-storage-pool pool`

Optional. The name or serial number of the virtual pool in which the remote volume should be created. A name that includes a space must be enclosed in double quotes. If the storage pool is in a remote system:

- You must specify the `remote-system` parameter.
- If the local and remote MCs can communicate, you can specify a name or serial number. Otherwise, you must specify a serial number.

The snap pool created on the secondary system will be the same size as the snap pool on the primary system.

`remote-system system`

Optional; required if the `remote-storage-pool` or `remote-vdisk` or `remote-volume` parameter specifies a destination in a remote system. The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

`remote-vdisk` *vdisk*

Optional. The name or serial number of the vdisk in which to create the remote volume and snap pool. A name that includes a space must be enclosed in double quotes.

To use this parameter, the local and remote MCs must be able to communicate. If the MCs cannot communicate, instead of using this parameter specify both the `remote-volume` parameter and the `secondary-address` parameter. If the vdisk is in a remote system, you must also specify the `remote-system` parameter. The snap pool created in the secondary system will be the same size as the snap pool on the primary system.

`remote-volume` *volume*

Optional; do not use with the `remote-storage-pool` or `remote-vdisk` parameter. The name or serial number of a replication-prepared volume to use as a secondary volume. A name that includes a space must be enclosed in double quotes. If the volume is in a remote system and the local and remote MCs can communicate, you can specify a name or serial number. Otherwise, you must specify a serial number.

`reserve size` [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Optional. Specifies the size of the snap pool to create if the primary volume is a standard volume. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the unit is 512-byte blocks. If this parameter is omitted, the size will be either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB.

`secondary-address` *ip=IPS|wwnn=WWNNs|wwpn=WWPNS*

Optional if the MCs can communicate and the `remote-system` parameter is specified; required if the MCs cannot communicate and the `remote-volume` parameter is specified. Specifies host ports in the remote system by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.2.1:3260. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`set` *name*

Optional. A name for the new replication set. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

If this parameter is omitted, the set is named `rsprimary-volume`.

`snapshot` *snapshot*

Optional. A name for the replication snapshot that will be created during the replication process. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Specifying this parameter will start the initial replication. You cannot specify both the `snapshot` parameter and the `nowait` parameter.

`primary-volume`

The name or serial number of a standard or master volume to use as the primary volume. A name that includes a space must be enclosed in double quotes.

Example For two systems connected with FC links, set up replication from local standard volume `Data` to remote vdisk `VD1` in remote system `System2`.

```
# create replication-set link-type FC remote-system System2 remote-vdisk VD1
Data
```

For two systems connected with FC links, set up replication from local master volume `Source` to remote replication-prepared volume `Dest`.

```
# create replication-set link-type FC remote-system System2 remote-volume Dest
Source
```

For two systems whose MCs aren't currently connected, set up replication from local master volume `MV` to a remote replication-prepared volume.

```
# create replication-set primary-address wwpn=207000c0ffd52c31,217000c0ffd52c31
remote-volume 00c0ffda421f000089b16b4d01000000 secondary-address
wwpn=207000c0ffd52c31,217000c0ffd52 MV
```

For two systems whose MCs aren't currently connected but will use iSCSI links, set up replication from local master volume `MV` to a remote replication-prepared volume.

```
# create replication-set link-type iSCSI primary-address ip=10.134.9.1
remote-volume 00c0ffda421f000089b16b4d01000000 secondary-address
ip=10.134.11.10,10.134.11.11 MV
```

Create a local replication set using existing master volume `Personnel` as the primary volume and a new volume in `vdisk vd1` for the secondary volume.

```
# create replication-set link-type FC remote-vdisk vd1 Personnel
```

Create a local replication set using existing master volume `Test` as the primary volume and existing replication-prepared volume `Test-backup` as the secondary volume.

```
# create replication-set link-type FC remote-volume Test-backup Test
```

- See also
- [add replication-volume](#)
 - [delete replication-set](#)
 - [remove replication-volume](#)
 - [replicate snapshot](#)
 - [show remote-systems](#)
 - [show replication-images](#)
 - [show replication-sets](#)
 - [show replication-volumes](#)

create schedule

Description Schedules a task to run automatically.

When scheduling `ReplicateVolume` tasks, a best practice is to schedule no more than three volumes to start replicating at the same time, and for those replications to recur no less than 60 minutes apart. If you schedule more replications to start at the same time, or schedule replications to start more frequently, some scheduled replications may not have time to complete.

Min. role manage

Syntax `create schedule`
`schedule-specification "specification"`
`task-name task-name`
`schedule-name`

Parameters `schedule-specification "specification"`

Defines when the task will first run, and optionally when it will recur and expire. You can use a comma to separate optional conditions. Dates cannot be in the past. For times, if neither AM nor PM is specified, a 24-hour clock is used.

- `start yyyy-mm-dd hh:mm [AM|PM]`
Specifies a date and a time in the future to be the first instance when the scheduled task will run, and to be the starting point for any specified recurrence.
- `[every # minutes|hours|days|weeks|months|years]`
Specifies the interval at which the task will run.
For better performance when scheduling a `TakeSnapshot` task that will run under heavy I/O conditions or on more than three volumes, the retention count and the schedule interval should be set to similar values. For example if the retention count is 10 then the interval should be set to 10 minutes. For a `ReplicateVolume` task, the minimum interval is 30 minutes.
- `[between hh:mm [AM|PM] and hh:mm [AM|PM]]`
Constrains the time range during which the task is permitted to run. Ensure that the start time is within the specified time range.
- `[only any|first|second|third|fourth|fifth|last|#st|#nd|#rd|#th
weekday|weekendday|Sunday|Monday|Tuesday|Wednesday|Thursday|Friday
|Saturday of year|month|January|February|March|April|May|June|July |
August|September|October|November|December]`
Constrains the days or months when the task is permitted to run. Ensure that this constraint includes the start date.
- `[count #]`
Constrains the number of times the task is permitted to run.
- `[expires yyyy-mm-dd hh:mm [AM|PM]]`
Specifies when the schedule expires, after which the task will no longer run.

NOTE: If tasks are scheduled close together, the end of one task may overlap the next task. If this happens, a task may not complete.

`task-name task-name`

The name of an existing task to run. The name is case sensitive. A name that includes a space must be enclosed in double quotes.

schedule-name

A name for the new schedule. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create schedule `Sched1` that runs `Task1` for the first time on March 1, 2014, runs daily between midnight and 1:00 AM, and runs for the last time in the morning of January 1, 2015.

```
# create schedule schedule-specification "start 2014-03-01 00:01, every 1 days,
between 12:00 AM and 1:00 AM, expires 2015-01-01 1:00 AM" task-name Task1 Sched1
```

Create schedule `Sched2` that runs `Task2` for the first time on March 1, 2014, and on the first weekday of each month, with no expiration.

```
# create schedule schedule-specification "start 2012-03-01 00:01 only first
weekday of month" task-name Task2 Sched2
```

See also

- [delete schedule](#)
- [set schedule](#)
- [show schedules](#)
- [show tasks](#)

create snap-pool

Description Creates a snap pool to use for snapshot data. This command applies to linear storage only.

A snap pool is an internal volume and cannot be mapped.

Min. role manage

Syntax `create snap-pool`
`size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
`vdisk vdisk`
`name`

Parameters `size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
Sets the snap-pool size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

Although a snap pool can be as small as 5.37 GB, the recommended minimum size is 50 GB.

`vdisk vdisk`

The name or serial number of the vdisk to create the snap pool in. A name that includes a space must be enclosed in double quotes.

`name`

A name for the new snap pool. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create the 50-GB snap pool SP1 on vdisk VD1.

```
# create snap-pool vdisk VD1 size 50GB SP1
```

See also

- [show snap-pools](#)
- [show vdisks](#)

create snapshots

Description Creates a snapshot of each specified source volume. The source volume can be a base volume, a standard volume, or a master volume. The first time a snapshot is created of a standard volume, the volume is converted to a master volume and a snap pool is created. The snap pool's size is either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Before creating or scheduling snapshots, verify that the vdisk has enough free space to contain the snap pool.

Min. role manage

Syntax `create snapshots`
 `[master-volumes master-volumes]`
 `volumes volumes`
 `snap-names`

Parameters `master-volumes master-volumes`
Deprecated—use the `volumes` parameter instead.

`volumes volumes`

A comma-separated list of 1–16 standard or master volumes of which to create snapshots. A standard volume is converted to a master volume before a snapshot is taken. A name that includes a space must be enclosed in double quotes.

`snap-names`

A comma-separated list of names for the resulting snapshots. Snapshot names must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create snapshots of standard volume V1 and master volume V2.

```
# create snapshots volumes V1,V2 V1snap,V2snap
```

See also

- [show snapshots](#)
- [show volumes](#)

create task

Description Creates a task that can be scheduled. You can create a task to enable or disable drive spin down; to take a snapshot of a standard or master volume; to reset a snapshot; to copy a standard, master, or snapshot volume to a new standard volume; or to replicate a replication set's primary volume to a remote system.

NOTE: Drive spin down is not applicable to disks in virtual pools.

The first time a snapshot or volume copy is created of a standard volume, the volume is converted to a master volume and a snap pool is created in the volume's vdisk. The snap pool's size is either 20% of the volume size or 5.37 GB, whichever is larger. Before creating or scheduling snapshots or copies, verify that the vdisk has enough free space to contain the snap pool. The recommended minimum size for a snap pool is 50 GB. The recommended minimum size for a snap pool is 50 GB.

△ **CAUTION:** Before scheduling a `ResetSnapshot` task, consider that if the snapshot is mounted/presented/mapped to a host, the snapshot must be unmounted/unpresented/unmapped before the reset is performed. Leaving it mounted/presented/mapped can cause data corruption. You should create a scheduled job on the host to unmount/unpresent/unmap the snapshot prior to resetting it.

Min. role `manage`

Syntax To create a task to take a snapshot:

```
create task
  retention-count #
  snapshot-prefix prefix
  source-volume volume
  type TakeSnapshot
  name
```

To create a task to reset a snapshot:

```
create task
  snapshot-volume volume
  type ResetSnapshot
  name
```

To create a task to copy a volume:

```
create task
  dest-prefix prefix
  dest-vdisk vdisk
  [modified-snapshot yes|no]
  source-volume volume
  type VolumeCopy
  name
```

To create a task to replicate a volume:

```
create task
  [replication-mode new-snapshot|last-snapshot]
  retention-count #
  snapshot-prefix prefix
  source-volume volume
  type ReplicateVolume
  name
```

To create a task to enable spin down for all disks:

```
create task
  type EnableDSD
  name
```

To create a task to disable spin down for all disks:

```
create task
  type DisabledSD
  name
```

Parameters `dest-prefix` *prefix*

A label to identify the volume copy created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 26 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`dest-vdisk` *vdisk*

The name or serial number of the destination `vdisk` for the volume copy. A name that includes a space must be enclosed in double quotes.

`modified-snapshot` *yes|no*

Optional. For a `VolumeCopy` task, specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot.

- `yes`: Include modified snapshot data.
- `no`: Exclude modified snapshot data.

If this parameter is omitted for a snapshot, modified snapshot data is excluded.

`replication-mode` *new-snapshot|last-snapshot*

Optional. Specifies whether to replicate a new snapshot of the volume to the remote system, or to replicate the last (most recent existing) snapshot of the volume to the remote system.

- `new-snapshot`: Replicate a new snapshot.
- `last-snapshot`: Replicate the most recent existing snapshot.

If this parameter is omitted, a new snapshot is replicated.

`retention-count` *#*

For a `TakeSnapshot` task this parameter specifies the number of snapshots created by this task to retain, from 1 to the licensed limit. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.

For a `ReplicateVolume` task this parameter specifies the number of replication images created by this task to retain, from 2 to 32. When a new image exceeds this limit, the oldest image with the same prefix is deleted. This parameter applies to the primary volume only. For the secondary volume, images will accumulate until either the secondary `vdisk`'s space limit is reached or the maximum number of images is reached, after which the oldest image will be deleted as new images are created.

`snapshot-prefix` *prefix*

A label to identify snapshots created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 26 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`snapshot-volume volume`

The name or serial number of the snapshot to reset. A name that includes a space must be enclosed in double quotes.

`source-volume volume`

For a `TakeSnapshot` task, the name or serial number of the standard or master volume of which to take a snapshot. For a `VolumeCopy` task, the name or serial number of the standard, master, or snapshot volume to copy. For a `ReplicateVolume` task, the name or serial number of the primary volume to replicate. A value that includes a space must be enclosed in double quotes.

`type TakeSnapshot | ResetSnapshot | VolumeCopy | ReplicateVolume | EnabledDSD | DisabledDSD`

The task type:

- `TakeSnapshot`: Takes a snapshot of a standard or master volume.
- `ResetSnapshot`: Deletes the data in the snapshot and resets it to the current data in the associated master volume. The snapshot's name and other volume characteristics are not changed.
- `VolumeCopy`: Copies a standard, master, or snapshot volume to a new standard volume. The command creates the destination volume you specify, which must be in a vdisk owned by the same controller as the source volume.
- `ReplicateVolume`: Replicates a replication set's primary volume to a remote system.
- `EnabledDSD`: Enables spin down for all disks. You can use this to enable or resume spin down during hours of infrequent activity.
- `DisabledDSD`: Disables spin down for all disks. You can use this to disable or suspend spin down during hours of frequent activity.

`name`

A name for the new task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create task `Snap` that takes a snapshot of master volume `VD1_V1` and retains only the latest four snapshots with the prefix `VD1_V1` (for example, `VD1_V1_S0001`).

```
# create task type TakeSnapshot source-volume VD1_V1 snapshot-prefix VD1_V1
retention-count 4 Snap
```

Create task `Reset` that resets snapshot `VD1_V1_S0001`.

```
# create task type ResetSnapshot snapshot-volume VD1_V1_S0001 Reset
```

Create task `Copy` that copies volume `VD1_V1` to vdisk `VD2` with name `C_V0001`.

```
# create task type VolumeCopy source-volume VD1_V1 dest-vdisk VD2 dest-prefix C
modified-snapshot yes Copy
```

Create task `Replicate` that replicates primary volume `VD1_V2`.

```
# create task type ReplicateVolume source-volume VD1_V2 snapshot-prefix VD1_V2
retention-count 4 Replicate
```

Create a task to enable or resume spin down for all disks.

```
# create task type EnabledDSD taskDSDresume
```

Create a task to disable or suspend spin down for all disks.

```
# create task type DisabledDSD taskDSDsuspend
```

- See also
- [create schedule](#)
 - [delete task](#)
 - [set task](#)
 - [show tasks](#)
 - [show volumes](#)

create temp-license

Description Creates and installs a temporary license to try licensed features of the storage system. You can create a temporary license one time. A temporary license will expire 60 days from the time it is created. If you do not install a permanent license before the temporary license expires, you cannot create new items using these features. However, you can continue to use existing snapshots and create new snapshots up to the base maximum limit, and you can continue to access existing replication images.

After a temporary license is created or a permanent license is installed, the command cannot be re-run.

Min. role manage

Syntax `create temp-license`

Example Enable licensed features for 60 days in order to try them.

```
# create temp-license
```

See also • [show license](#)

create user

Description Creates a user account. The system supports 12 user accounts. You can create a general user that can access the WBI, CLI, or FTP interface, or an SNMPv3 user that can access the MIB or receive trap notifications. SNMPv3 user accounts support SNMPv3 security features such as authentication and encryption.

Min. role manage

Syntax `create user`
 `[authentication-type MD5|SHA|none]`
 `[base 2|10]`
 `[interfaces interfaces]`
 `[locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t]`
 `[password password]`
 `[precision #]`
 `[privacy-password encryption-password]`
 `[privacy-type DES|AES|none]`
 `[roles roles]`
 `[storage-size-base 2|10]`
 `[storage-size-precision #]`
 `[storage-size-units auto|MB|GB|TB]`
 `[temperature-scale celsius|c|fahrenheit|f]`
 `[timeout #]`
 `[trap-host IP-address]`
 `[type novice|standard|advanced|diagnostic]`
 `[units auto|MB|GB|TB]`
 `name`

Parameters `authentication-type MD5|SHA|none`
Optional. For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.

- MD5: MD5 authentication. This is the default.
- SHA: SHA (Secure Hash Algorithm) authentication.
- none: No authentication.

`base 2|10`

Optional. Sets the base for entry and display of storage-space sizes:

- 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. In base 2 when you set a size, whether you specify a base-2 or base-10 size unit, the resulting size will be in base 2.
- 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. In base 10 when you set a size, the resulting size will be in the specified unit. This option is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

`interfaces interfaces`

Optional. Specifies the interfaces that the user can access. Multiple values must be separated by commas and no spaces. A command that specifies `snmpuser` or `snmptarget` cannot also specify a non-SNMP interface.

- `cli`: Command-line interface. This is enabled by default.
- `wbi`: Web-browser interface. This is enabled by default.
- `ftp`: FTP interface.
- `smis`: Storage Management Initiative Specification (SMI-S) interface.
- `snmpuser`: Allows an SNMPv3 user to view the SNMP MIB.
- `snmptarget`: Allows an SNMPv3 user to receive SNMP trap notifications. This option requires the `trap-host` parameter.
- `none`: No interfaces.

`locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t`
Optional. The display language. The default is English.

`password password`

Optional in console format; required for XML API format. Sets a new password for the user. Password rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

If this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed obscured for security reasons. For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password.

`precision #`

Optional. Sets the number of decimal places (1–10) for display of storage-space sizes.

`privacy-password encryption-password`

Optional. For an SNMPv3 user whose `privacy-type` parameter is set to use encryption, this specifies the encryption password. Password rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

`privacy-type DES|AES|none`

Optional. For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the `privacy-password` parameter and the `authentication-type` parameter.

- `DES`: Data Encryption Standard.
- `AES`: Advanced Encryption Standard.
- `none`: No encryption. This is the default.

`roles roles`

Optional. Specifies the user's roles as one or more of the following values:

- `monitor`: User can view but not change system settings. This is the default.
- `manage`: User can view and change system settings.
- `diagnostic`: User can view and change system settings.

Multiple values must be separated with a comma (with no spaces). If multiple values are specified, the user's access to commands will be determined by the highest role specified.

`storage-size-base 2|10`

Optional. Alias for `base`.

`storage-size-precision #`

Optional. Alias for `precision`.

`storage-size-units auto|MB|GB|TB`

Optional. Alias for `units`.

`temperature-scale celsius|c|fahrenheit|f`

Optional. Sets the scale for display of temperature values:

- `fahrenheit` or `f`: Temperatures are shown in degrees Fahrenheit.
- `celsius` or `c`: Temperatures are shown in degrees Celsius. This is the default.

`timeout #`

Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

`trap-host IP-address`

Optional. For an SNMPv3 user whose `interface` parameter is set to `snmptarget`, this specifies the IP address of the host that will receive SNMP traps.

`type novice|standard|advanced|diagnostic`

Optional. Identifies the user's experience level. This parameter is informational only and does not affect access to commands. The default is `standard`.

`units auto|MB|GB|TB`

Optional. Sets the unit for display of storage-space sizes:

- `auto`: Sizes are shown in units determined by the system. This is the default.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

Based on the `precision` setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `units` is set to `TB`, `precision` is set to 1, and `base` is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.

`name`

A name for the new user, which cannot already exist in the system. Input rules:

- The value is case sensitive.
- The value can have a maximum of 29 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include printable UTF-8 characters except a space or: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create user John who will view system information using base 2 in the WBI.

```
# create user base 2 interfaces wbi roles monitor John
Enter new password: *****
Re-enter new password: *****
```

Create user MIB that can view the SNMP MIB, using authentication and encryption.

```
# create user interfaces snmpuser password Abcd1234 authentication-type SHA
privacy-type AES privacy-password Abcd5678 MIB
```

Create user Traps that can receive SNMP trap notifications, using authentication without encryption.

```
# create user interfaces snmptarget authentication-type MD5 trap-host
172.22.4.171 Traps
```

```
Enter new password: *****
```

```
Re-enter new password: *****
```

- See also
- [delete user](#)
 - [set snmp-parameters](#)
 - [set user](#)
 - [show users](#)

create vdisk

Description Creates a vdisk using the specified RAID level, disks, and spares. This command applies to linear storage only.

All disks in the vdisk must be the same type (enterprise SAS, for example).

For each RAID level, the minimum and maximum numbers of disks supported are:

- **NRAID:** 1
- **RAID 0:** 2–16
- **RAID 1:** 2
- **RAID 3:** 3–16
- **RAID 5:** 3–16
- **RAID 6:** 4–16
- **RAID 10:** 4–16
- **RAID 50:** 6–32

For best practices for creating vdisks, see the Storage Management Guide.

When you create a vdisk, also called a linear disk group, the system creates a linear pool with the same name. A linear pool can contain a single linear disk group.

Min. role manage

Syntax `create vdisk`
 `[assigned-to a|b|auto]`
 `[chunk-size 16k|32k|64k|128k|256k|512k]`
 `disks disks`
 `level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10`
 `|raid50|r50`
 `[mode online|offline]`
 `[spare disks]`
 `name`

Parameters `assigned-to a|b|auto`

Optional. For a system operating in Active-Active ULP mode, this specifies the controller to own the vdisk. To let the system automatically load-balance vdisks between controllers, use `auto` or omit this parameter. In Single Controller mode, this parameter is ignored; the system automatically load-balances vdisks in anticipation of the insertion of a second controller in the future.

`chunk-size 16k|32k|64k|128k|256k|512k`

Optional. The amount of contiguous data, in KB, that is written to a vdisk member before moving to the next member of the vdisk. For RAID 50, this option sets the chunk size of each RAID-5 subvdisk. The chunk size of the RAID-50 vdisk is calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For NRAID and RAID 1, `chunk-size` has no meaning and is therefore not applicable. The default size is 512k.

`disks disks`

The IDs of the disks to include in the vdisk. RAID 10 requires a minimum of two RAID-1 sub-vdisks each having two disks. RAID 50 requires a minimum of two RAID-5 sub-vdisks each having three disks. For disk syntax, see "[Command syntax](#)" (page 23).

`level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10`
`|raid50|r50`

Specifies the RAID level.

`mode online|offline`

Optional. Specifies whether the vdisk is initialized online or offline.

- `online`: Enables you to use the vdisk immediately after creating it while it is initializing. Because `online` uses the `verify` method to create the vdisk, it takes longer to complete initializing than `offline`. Online initialization is fault-tolerant. This option is the default.
- `offline`: You must wait for the vdisk initialization process to finish before using the vdisk. However, `offline` takes less time to complete initializing than `online`.

spare disks

Optional. The IDs of 1–4 dedicated spares to assign to a RAID 1, 3, 5, 6, 10, or 50 vdisk. For disk syntax, see ["Command syntax" \(page 23\)](#).

name

A name for the new vdisk. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create the RAID-1 vdisk VD1 using two disks in the first enclosure.

```
# create vdisk level raid1 disks 0.1,0.3 VD1
```

Create the RAID-50 vdisk VD2 having three RAID-5 sub-vdisks, each having three disks.

```
# create vdisk level r50 disks 0.1-3:0.4-6:0.7-9 VD2
```

Create the RAID-6 vdisk vdR6 using four disks.

```
# create vdisk level r6 disks 2.3-4,2.8-9 vdR6
```

See also

- [delete vdisks](#)
- [set vdisk](#)
- [show disks](#)
- [show vdisks](#)

create volume

Description Creates a volume in a vdisk or pool. You must specify a size for the volume. You can create the volume unmapped or set its default mapping. Default mapping settings apply to all hosts, unless overridden by an explicit mapping between a host and the volume. You can later change the mapping by using the [map volume](#) and [unmap volume](#) commands. By default, this command will not map the created volume.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

If you intend to use the volume as the secondary volume in a replication set, you can create a replication-prepared volume. A secondary volume cannot be mapped.

To create multiple volumes at once, use the [create volume-set](#) command.

Min. role manage

Syntax `create volume`
 `[access read-write|rw|read-only|ro|no-access]`
 `[lun LUN]`
 `[pool pool]`
 `[ports ports]`
 `[prepare-replication-volume]`
 `[reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]`
 `size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
 `[snap-pool snap-pool]`
 `[snappable]`
 `vdisk vdisk`
 `[volume-group volume-group]`
 `name`

Parameters `access read-write|rw|read-only|ro|no-access`
Optional. The access permission to use for the mapping: `read-write` (`rw`), `read-only` (`ro`), or `no-access`. If `no-access` is specified, the volume is not mapped. The default is `read-write`.

`lun LUN`
Optional if the `access` parameter is set to `no-access`. Specifies the LUN to assign to the mapping on all ports.

`pool pool`
Optional for linear volumes; required for virtual volumes. The name or serial number of the pool in which to create the volume.

`ports ports`
Optional. The ports through which the host can access the volume. All specified ports must be the same type (FC, for example). For port syntax, see "[Command syntax](#)" (page 23). If this parameter is omitted, all ports are selected.

`prepare-replication-volume`
Optional. Linear storage only. Specifies to create a secondary volume for use in a replication set. This parameter precludes use of the `lun` and `ports` parameters because a secondary volume cannot be mapped.

`reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
Optional. Linear storage only. Specifies the size of the snap pool to create in the vdisk. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks. If this parameter is omitted, the size will be either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Use either this parameter or the `snap-pool` parameter.

`size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`

Sets the volume size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

A value less than 4 MB (3.8 MiB) will be rounded up to that size. Any larger value will be rounded down to the next multiple of that size. If overcommit is enabled, the size can exceed the physical capacity of the storage pool. The maximum volume size is 140 TB (128 TiB). To see whether overcommit is enabled, use the `show pools` command.

`snap-pool snap-pool`

Optional. The name or serial number of the snap pool to associate with the new volume. A name that includes a space must be enclosed in double quotes.

`snappable`

Optional. Specifies to create a master volume instead of a standard volume.

`vdisk vdisk`

Optional; required for linear volumes. The name or serial number of the vdisk in which to create the volume. A name that includes a space must be enclosed in double quotes.

`volume-group volume-group`

Optional. The name of a volume group to which to add the volume. A name that includes a space must be enclosed in double quotes. If the group does not exist, it will be created.

`name`

A name for the new volume. The name must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create the 20-GB volume V1 in vdisk VD1, and map it to ports A1 and B1 using LUN 5.

```
# create volume vdisk VD1 size 20GB ports a1,b1 lun 5 V1
```

Create a 100-GB standard volume named MyVolume in pool A, map it to use LUN 5 with read-write access through port 1 in each controller, and add it to volume group MyGroup.

```
# create volume MyVolume pool A size 100GB access rw lun 5 ports 1 volume-group MyGroup
```

Create a 20-GB standard volume named Secrets in storage pool A, and map it to use LUN 333 with read-only access through all ports.

```
# create volume Secrets pool A size 20GB lun 333 access read-only
```

Create a 1-TB secondary volume named NewYork in storage pool B.

```
# create volume NewYork pool B size 1TB prepare-replication-volume
```

- See also
- [create volume-set](#)
 - [delete volumes](#)
 - [set volume](#)
 - [show pools](#)
 - [show ports](#)
 - [show vdisks](#)
 - [show volume-groups](#)
 - [show volumes](#)

create volume-group

Description Creates a volume group that includes specified volumes.

Min. role manage

Syntax `create volume-group`
`volumes volumes`
`volume-group`

Parameters `volumes volumes`

A comma-separated list of the names of volumes to include in the volume group. A name that includes a space must be enclosed in double quotes.

`volume-group`

A name for the volume group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Create a volume group named VGroup1 that includes hosts Vol0001 and Vol0002.

```
# create volume-group volumes Vol0001,Vol0002 VGroup1
```

- See also**
- [add volume-group-members](#)
 - [delete volume-groups](#)
 - [remove volume-group-members](#)
 - [set volume-group](#)
 - [show volume-groups](#)
 - [show volumes](#)

create volume-set

Description Creates a specified number of volumes in a `vdisk`. You must specify a base name and a size for the volumes. You can create the volumes unmapped or set their default mapping. Default mapping settings apply to all hosts, unless overridden by an explicit mapping between a host and the volume. You can later change mappings by using the `map volume` and `unmap volume` commands. By default, this command will not map the created volumes.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

Min. role `manage`

Syntax `create volume-set`
`[access read-write|rw|read-only|ro|no-access]`
`[baselun base-LUN]`
`basename base-name`
`count #`
`[pool pool]`
`[ports ports]`
`size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
`[vdisk vdisk]`
`[volume-group volume-group]`

Parameters `access read-write|rw|read-only|ro|no-access`

Optional. The access permission to use for the mapping: `read-write` (`rw`), `read-only` (`ro`), or `no-access`. If `no-access` is specified, the volume is not mapped. The default is `read-write`.

`baselun base-LUN`

Optional. The first in a sequence of LUNs to assign to map the volumes through ports specified by the `ports` parameter. If the `baselun` and `ports` parameters are omitted, the volumes are not mapped. If a LUN to be assigned to a volume is already in use, an error message is displayed and that volume and any subsequent volumes are not mapped.

`basename base-name`

A name to which a number will be appended to generate a different name for each volume. Volume names must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 16 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Resulting volumes are numbered sequentially starting with 0000. If volumes with the specified `basename` already exist, names of new volumes start with the first available name in the sequence. For example: for `basename vd1_v`, if `vd1_v0000` and `vd1_v0002` exist, the next volumes created will be `vd1_v0001` and `vd1_v0003`.

`count #`

The number of volumes to create, from 1 to 128. Volumes will be created up to the maximum number supported per `vdisk`.

`pool pool`

Optional; required for virtual volumes. The name or serial number of the pool in which to create the volumes. A name that includes a space must be enclosed in double quotes.

`ports ports`

Optional. The controller ports to use for the mapping. All ports must be the same type. For port syntax, see ["Command syntax" \(page 23\)](#). If not all ports are specified, the unspecified ports are not mapped. If the `ports` and `baselun` parameters are omitted, the volumes are not mapped.

`size size [B | KB | MB | GB | TB | KiB | MiB | GiB | TiB]`

Sets the volume size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks. If the combined size of the volumes exceeds the capacity of the vdisk, an error message is displayed and no volumes are created.

A value less than 4 MB (3.8 MiB) will be rounded up to that size. Any larger value will be rounded down to the next multiple of that size. If overcommit is enabled, the volume size can exceed the physical capacity of the storage pool. The maximum volume size is 140 TB (128 TiB). To see whether overcommit is enabled, use the [show system-parameters](#) command. If overcommit is disabled and the combined size of the volumes will exceed the capacity of the storage pool, an error message is displayed and no volumes are created.

`vdisk vdisk`

Optional; required for linear volumes. The name or serial number of the vdisk in which to create the volumes. A name that includes a space must be enclosed in double quotes.

`volume-group volume-group`

Optional. The name of a volume group to which to add the volume. A name that includes a space must be enclosed in double quotes. If the group does not exist, it will be created.

Example Create two unmapped, 100-GB volumes with base name `data-` in vdisk `data`.

```
# create volume-set count 2 size 100GB vdisk data basename data-
```

Create ten 20-GB volumes with the base name `vd1_v` in vdisk `vd1`, mapped starting with LUN 5 with read-only access through port A1.

```
# create volume-set count 10 size 20GB vdisk vd1 basename vd1_v baselun 5
access ro ports a1
```

- See also
- [create volume](#)
 - [delete volumes](#)
 - [map volume](#)
 - [set volume](#)
 - [show maps](#)
 - [show pools](#)
 - [show vdisks](#)
 - [show volume-groups](#)
 - [show volumes](#)
 - [unmap volume](#)

delete all-master-volumes

Description Deletes all master volumes associated with a specified snap pool. This command applies to linear storage only.

The volumes' schedules and tasks are also deleted.

NOTE: You must delete all snapshots that exist for the master volumes before you can delete the master volumes.

Min. role manage

Syntax `delete all-master-volumes
snap-pool volume`

Parameters `snap-pool volume`
The name or serial number of the snap pool whose master volumes should be deleted. A name that includes a space must be enclosed in double quotes.

Example Delete all master volumes associated with snap pool SP1.

```
# delete all-master-volumes snap-pool SP1
```

See also

- [delete all-snapshots](#)
- [show master-volumes](#)
- [show snap-pools](#)

delete all-snapshots

Description Deletes all snapshots associated with a specified volume. All data associated with the snapshots is deleted and their space in the snap pool is freed for use. The specified volume can be a master volume or a snap pool. The snapshots' schedules and tasks are also deleted.

Min. role manage

Syntax `delete all-snapshots`
 `[delete-type all-standard-snapshots|all-replication-snapshots`
 `|all-snapshot-types]`
 `volume volume`

Parameters `delete-type all-standard-snapshots|all-replication-snapshots`
 `|all-snapshot-types`
Optional. Specifies the type of snapshots that can be deleted. If this parameter is omitted, the default is `all-standard-snapshots`, which means that the command will try to delete only standard snapshots and will not succeed if replication snapshots exist.

`volume volume`

The name or serial number of the master volume or snap pool. A name that includes a space must be enclosed in double quotes.

Example Delete all snapshots associated with master volume MV1.

```
# delete all-snapshots volume MV1
```

Delete all replication snapshots associated with master volume MV2, which is the primary volume in a replication set.

```
# delete all-snapshots volume MV2 delete-type all-replication-snapshots
```

See also

- [show snapshots](#)
- [show volumes](#)

delete chap-records

Description For iSCSI, deletes a specified CHAP record or all CHAP records. This command is permitted whether or not CHAP is enabled.

Min. role manage

Syntax To delete the CHAP record for a specific originator:

```
delete chap-records
    name originator-name
```

To delete all CHAP records:

```
delete chap-records
    all
```

Parameters name *originator-name*
The originator name, typically in IQN format.

all
Delete all CHAP records in the database.

Example Delete the CHAP record for a specific originator.

```
# delete chap-records name iqn.1991-05.com.microsoft:myhost.domain
```

Delete all CHAP records.

```
# delete chap-records all
```

See also

- [create chap-record](#)
- [set chap-record](#)
- [show chap-records](#)
- [show iscsi-parameters](#)

delete global-spare (Deprecated)

Use [remove spares](#).

delete host (Deprecated)

Use [delete initiator-nickname](#).

delete host-groups

Description Deletes specified host groups and optionally all hosts in those groups.

Before using the option to delete all the hosts in the groups, ensure that the hosts are unmapped.

Min. role manage

Syntax `delete host-groups`
`[delete-hosts]`
`host-groups|all`

Parameters `delete-hosts`

Optional. Specifies to delete all hosts in the groups. If this parameter is omitted, the host groups will be deleted but their hosts will not be deleted.

`host-groups|all`

Specifies either:

- A comma-separated list of the names of host groups to delete. A name that includes a space must be enclosed in double quotes.
- `all`: Deletes all host groups.

Example Delete host group `HGroup1` but not the hosts in those groups.

```
# delete host-groups HGroup1
```

Delete all host groups and the hosts in those groups.

```
# delete host-groups delete-hosts all
```

See also • [show host-groups](#)

delete hosts

Description Deletes specified hosts that are not in a host group. Mapped and unmapped hosts can be deleted. Deleting a host does not delete its initiators. Volume maps continue to apply to the initiators in the host that is deleted.

Min. role manage

Syntax `delete hosts`
`hosts|all`

Parameters `hosts|all`
Specifies either:

- A comma-separated list of the names of hosts to delete. A name that includes a space must be enclosed in double quotes.
- `all`: Deletes all hosts.

Example Delete hosts Host1 and Host2.

```
# delete hosts Host1,Host2
```

Delete all hosts.

```
# delete hosts all
```

- See also**
- [create host](#)
 - [set host](#)
 - [set initiator](#)
 - [show host-groups](#)
 - [show initiators](#)

delete initiator-nickname

Description Deletes manually created initiators or the nickname of discovered initiators.

Volume maps continue to apply to the initiators in the host that is deleted. If you delete the nickname of a discovered initiator, commands will show the initiator by its ID.

Min. role manage

Syntax `delete initiator-nickname
 initiators`

Parameters *initiators*

A comma-separated list of the nicknames or IDs of initiators to delete.

Example Delete the manually created initiator named `Init1`.

```
# delete initiator-nickname Init1
```

Delete the nickname of discovered initiator `Init2`.

```
# delete initiator-nickname Init2
```

See also

- [create host](#)
- [set initiator](#)
- [show initiators](#)

delete master-volume (Deprecated)

Use [delete volumes](#).

delete pools

Description Deletes specified pools.

△ CAUTION: Deleting a pool will delete all the data it contains.

For linear storage, a pool and a disk group are logically equivalent. For a linear pool, if the pool contains volumes, the command will prompt for confirmation to delete the volumes. If the reply is `yes`, the command will unmap and delete all volumes in the pool, delete the pool and corresponding disk group, and make all the disks available. If the reply is `no`, the command will be canceled. You cannot delete a disk group if it contains a snap pool that is associated with a master volume in another disk group.

For virtual storage, a pool can contain multiple disk groups. For a virtual pool, if the pool contains volumes, the command will prompt for confirmation to delete the volumes. If the reply is `yes`, the command will unmap and delete all volumes in the pool, and then delete each disk group in the pool and make all the disks available. If the reply is `no`, the command will be canceled.

NOTE: If you delete a quarantined disk group and its missing disks are later found, the group will reappear as quarantined or offline and you must delete it again (to clear those disks).

Min. role `manage`

Syntax `delete pools`
 `[prompt yes|no]`
 pools

Parameters `prompt yes|no`
Optional. For scripting, this specifies an automatic reply to confirmation prompts, as when a utility is running on a pool to be removed:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

pools

A comma-separated list of the names or serial numbers of the pools to delete. A name that includes a space must be enclosed in double quotes.

Example Delete pool `dg1`, which contains a volume and has a utility running.

```
# delete pools dg1
Pool dg1 has a job running. Do you want to continue? yes
Pool dg1 has volumes present. Do you want to continue? yes
```

See also

- [delete vdisks](#)
- [remove disk-groups](#)
- [show master-volumes](#)
- [show pools](#)
- [show vdisks](#)

delete remote-system

Description Deletes the persistent association with a remote system. This command applies to linear storage only.

After establishing replication to a remote system, if you choose to delete the remote system you can safely do so without affecting replications. However, because the remote system's name and IP address will no longer appear in user interfaces, record this information before deleting the remote system so that you can access it at a later time, such as to delete old replication images or for disaster recovery.

Min. role `manage`

Syntax `delete remote-system
 system`

Parameters *system*

The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

Example Delete remote system `System2`.

```
# delete remote-system System2
```

See also

- [create remote-system](#)
- [remote](#)
- [set remote-system](#)
- [show remote-systems](#)

delete replication-set

Description Deletes a replication set. This command applies to linear storage only.

The replication volumes associated with the replication set are converted to master volumes and any replication snapshots associated with the replication volumes are converted to standard snapshots. Snapshots are converted regardless of the number of snapshots allowed by the system's license. This command must be run on the primary system.

Min. role manage

Syntax `delete replication-set
ID`

Parameters *ID*

The name or serial number of either the replication set or its primary volume. A name that includes a space must be enclosed in double quotes.

Example Delete replication set RS1.

```
# delete replication-set RS1
```

Delete the replication set with primary volume MV1.

```
# delete replication-set MV1
```

See also

- [show replication-sets](#)
- [show replication-volumes](#)

delete schedule

Description Deletes a task schedule. If you no longer want a scheduled task to occur, you can delete the schedule. When a volume or snapshot is deleted, its schedules and tasks are also deleted.

If the schedule uses a task that is not used by any other schedule, a confirmation prompt will ask whether you want to delete the schedule and the task. Reply `yes` to delete both, or `no` to delete only the schedule.

Min. role `manage`

Syntax `delete schedule`
`[prompt yes|no]`
`schedule`

Parameters `prompt yes|no`
Optional. For scripting, this specifies whether to automatically reply `yes` or `no` to confirmation prompts. If this parameter is omitted, you must manually reply to confirmation prompts.

`schedule`
The name of the schedule to delete.

Example Delete schedule `Sched1`, whose task is used by another schedule.

```
# delete schedule Sched1
```

Delete schedule `Sched2`, whose task is not used by another schedule.

```
# delete schedule Sched2
This schedule uses a task (Task1) that is not used by any other schedule.
Do you want to delete this task, also? (y/n) yes
```

See also

- [create schedule](#)
- [set schedule](#)
- [show schedules](#)

delete snap-pool

Description Deletes a snap pool. This command applies to linear storage only.

NOTE: You must disassociate all master volumes from the snap pool before you can delete it.

Min. role `manage`

Syntax `delete snap-pool`
`snap-pool`

Parameters *snap-pool*
The name or serial number of the snap pool to delete. A name that includes a space must be enclosed in double quotes.

Example Delete snap pool SP1.
`# delete snap-pool SP1`

See also

- [show master-volumes](#)
- [show snap-pools](#)
- [show volumes](#)

delete snapshot

Description Deletes specified snapshots. All data uniquely associated with the snapshot is deleted and associated space in the snap pool is freed for use. The snapshot's schedules are also deleted.

Min. role manage

Syntax `delete snapshot`
 `[cleanup]`
 `[delete-priority standard-snapshot | volume-copy-snapshot | replication-snapshot`
 `| replicating-snapshot | common-sync-point-snapshot | only-sync-point-snapshot`
 `| queued-snapshot]`
 `[force]`
 snapshots

Parameters `cleanup`

Optional. When a master volume's last snapshot is deleted, automatically convert the master volume to a standard volume and delete the snap pool.

`delete-priority standard-snapshot | volume-copy-snapshot`
`| replication-snapshot | replicating-snapshot | common-sync-point-snapshot`
`| only-sync-point-snapshot | queued-snapshot`

Optional. Priority of snapshots that can be deleted. If the specified priority is less than the snapshot's priority, deletion is prevented. This is intended to protect against accidentally deleting high-priority snapshots. You must specify this parameter or the `force` parameter, but not both.

`force`

Optional. Overrides priority protection and forces the specified snapshot to be deleted. You must specify this parameter or the `delete-priority` parameter, but not both.

snapshots

A comma-separated list of the names or serial numbers of the snapshots to delete. A name that includes a space must be enclosed in double quotes.

Example Delete snapshot SS1, which is being used in a replication operation.

```
# delete snapshot delete-priority replicating-snapshot SS1
```

Force deletion of snapshot SS2.

```
# delete snapshot force SS2
```

Delete standard snapshots s1, s2, and s3.

```
# delete snapshot s1,s2,s3
```

- See also**
- [delete all-snapshots](#)
 - [delete snapshot-write-data](#)
 - [show priorities](#)
 - [show snapshots](#)

delete snapshot-write-data

Description Deletes data written to a standard snapshot after it was created. This command applies to linear storage only.

Deleting this modified data reverts the snapshot to the state when it was first taken. This command is not allowed for a replication snapshot. Unmount/unpresent/unmap the snapshot before deleting the snapshot write data to avoid conflicts with the host operating system.

Min. role manage

Syntax `delete snapshot-write-data
snapshot`

Parameters *snapshot*

The name or serial number of the snapshot from which to delete modified data. A name that includes a space must be enclosed in double quotes.

Example Delete only modified data from snapshot SS1.

```
# delete snapshot-write-data SS1
```

See also

- [delete snapshot](#)
- [show snapshots](#)

delete task

Description Deletes a task. If the task is scheduled, a confirmation prompt will ask whether you want to delete the task and its schedules. Reply `yes` to delete both, or `no` to cancel the command.

Min. role `manage`

Syntax `delete task`
 `[prompt yes|no]`
 `task`

Parameters `prompt yes|no`
Optional. For scripting, this specifies whether to automatically reply `yes` or `no` to confirmation prompts. If this parameter is omitted, you must manually reply to confirmation prompts.

`task`
The name of the task to delete.

Example Delete unscheduled task `Task1`.

```
# delete task Task1
```

Delete scheduled task `Task2`.

```
# delete task Task2
```

```
Task Task2 has 2 schedules associated with it that will also be deleted.
```

```
Do you want to continue? (y/n) no
```

See also

- [create task](#)
- [delete schedule](#)
- [show schedules](#)
- [show tasks](#)

delete user

Description Deletes a user account. Except for the user you are logged in as, you can delete any user, including the default users. However, the system requires at least one CLI user with the manage role to exist. When a user is deleted, any sessions associated with that user name are terminated.

Min. role manage

Syntax delete user
 [noprompt]
 name

Parameters noprompt
Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

name
The user to delete. Names are case sensitive.

Example Delete user jsmith.

```
# delete user jsmith  
Are you sure you want to delete user jsmith? (y/n) yes
```

Delete user Kim and suppress the confirmation prompt.

```
# delete user noprompt Kim
```

See also

- [create user](#)
- [show users](#)

delete vdisks

Description Deletes specified vdisks. This command applies to linear storage only.

This unmaps and deletes all volumes and snapshots in the vdisks and makes all the disks available.

△ CAUTION: Deleting a vdisk will delete all data it contains.

NOTE: You cannot delete a vdisk if it contains a snap pool that is associated with a master volume in another vdisk.

NOTE: If you delete a quarantined vdisk and its missing disks are later found, the vdisk will reappear as quarantined or offline and you must delete it again (to clear those disks).

Min. role `manage`

Syntax `delete vdisks`
`[prompt yes|no]`
`vdisks`

Parameters `prompt yes|no`

Optional. For scripting, this specifies an automatic reply to the confirmation prompt that appears if a utility is running on the vdisk:

- `yes`: Stop the utility and allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

vdisks

A comma-separated list of the names or serial numbers of the vdisks to delete. A name that includes a space must be enclosed in double quotes.

Example Delete vdisks `VD1` and `VD2`.

```
# delete vdisks VD1,VD2
```

Delete vdisk `VD3` on which a utility is running.

```
# delete vdisks VD3
```

```
Vdisk VD3 has a job running. Do you want to continue? yes
```

- See also
- [create vdisk](#)
 - [show master-volumes](#)
 - [show vdisks](#)

delete vdisk-spare (Deprecated)

Use [remove spares](#).

delete volume-groups

Description Deletes specified volume groups and optionally all volumes in those groups.

Before using the option to delete all the volumes in the groups, ensure that the volumes are unmapped. If any volume is mapped, the command will fail and no changes will be made.

Min. role manage

Syntax `delete volume-groups`
`[delete-volumes]`
`volume-groups|all`

Parameters `delete-volumes`

Optional. Specifies to delete all volumes in the groups. If this parameter is omitted, the volume groups will be deleted but their volumes will not be deleted.

`volume-groups|all`

Specifies either:

- A comma-separated list of the names of volume groups to delete. A name that includes a space must be enclosed in double quotes.
- `all`: Deletes all volume groups.

Example Delete volume groups `VGroup1` and `VGroup2` but not the volumes in those groups.

```
# delete volume-groups VGroup1,VGroup2
```

Delete all volume groups and the volumes in those groups.

```
# delete volume-groups delete-volumes all
```

See also • [show volume-groups](#)

delete volumes

Description Deletes specified volumes.

△ CAUTION: Deleting a volume will delete all data it contains and its schedules.

Min. role `manage`

Syntax `delete volumes`
`volumes`

Parameters `volumes`
A comma-separated list of the names or serial numbers of the volumes to delete. A name that includes a space must be enclosed in double quotes.

Example Delete volumes V1 and V2.

```
# delete volumes V1,V2
```

See also

- [create volume](#)
- [show volumes](#)

dequarantine

Description Removes a disk group from quarantine.

△ CAUTION: Carefully read this topic to determine whether to use the `dequarantine` command to manually remove a disk group from quarantine. The `dequarantine` command should only be used as part of the emergency procedure to attempt to recover data and is normally followed by use of the CLI `trust` command. If a disk group is manually dequarantined and does not have enough disks to continue operation, its status will change to `OFFL` and its data may or may not be recoverable through use of the `trust` command. It is recommended that you contact technical support for assistance in determining if the recovery procedure that makes use of the `dequarantine` and `trust` commands is applicable to your situation and for assistance in performing it. Also, see the help for the `trust` command.

To continue operation and not go to quarantined status, a RAID-3 or RAID-5 disk group can have only one inaccessible disk, a RAID-6 disk group can have only one or two inaccessible disks, and a RAID-10 or RAID-50 disk group can have only one inaccessible disk per subgroup. For example, a 16-disk RAID-10 disk group can remain online (critical) with 8 inaccessible disks if one disk per mirror is inaccessible.

The system will automatically quarantine a disk group having a fault-tolerant RAID level if one or more of its disks becomes inaccessible, or to prevent invalid (“stale”) data that may exist in the controller from being written to the disk group. Quarantine will not occur if a known-failed disk becomes inaccessible or if a disk becomes inaccessible after failover or recovery. The system will automatically quarantine an NRAID or RAID-0 disk group to prevent invalid data from being written to the disk group. If quarantine occurs because of an inaccessible disk, event 172 is logged. If quarantine occurs to prevent writing invalid data, event 485 is logged. For recommended actions for these events, see the Event Descriptions Reference Guide.

Examples of when quarantine can occur are:

- At system power-up, a disk group has fewer disks online than at the previous power-up. This may happen because a disk is slow to spin up or because an enclosure is not powered up. The disk group will be automatically dequarantined if the inaccessible disks come online and the disk group status becomes `FTOL` (fault tolerant and online), or if after 60 seconds the disk group status is `QTCR` or `QTDN`.
- During system operation, a disk group loses redundancy plus one more disk. For example, three disks are inaccessible in a RAID-6 disk group or two disks are inaccessible for other fault-tolerant RAID levels. The disk group will be automatically dequarantined if after 60 seconds the disk group status is `FTOL`, `FTDN`, or `CRIT`.

Quarantine isolates the disk group from host access and prevents the system from changing the disk group status to `OFFL` (offline). The number of inaccessible disks determines the quarantine status. From least to most severe:

- `QTDN` (quarantined with a down disk): The RAID-6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is `QTCR` or `QTDN`, the disk group is automatically dequarantined.
- `QTCR` (quarantined critical): The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is `QTCR` or `QTDN`, the disk group is automatically dequarantined.
- `QTOF` (quarantined offline): The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 disk group.

When a disk group is quarantined, its disks become write-locked, its volumes become inaccessible, and it is not available to hosts until it is dequarantined. If there are interdependencies between the quarantined disk group's volumes and volumes in other disk groups, quarantine may temporarily impact operation of those other volumes. For example, if the quarantined disk group contains the snap pool used for snapshot or volume-copy or replication operations, quarantine may temporarily cause the associated master volume to go offline; a volume-copy or replication operation can also be disrupted if an associated volume (snap pool, source volume, or destination volume) goes offline.

Depending on the operation, the length of the outage, and the settings associated with the operation, the operation may automatically resume when the disk group is dequarantined or may require manual intervention. A disk group can remain quarantined indefinitely without risk of data loss.

A disk group is dequarantined when it is brought back online, which can occur in three ways:

- If the inaccessible disks come online, making the disk group FTOL, the disk group is automatically dequarantined.
- If after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined. The inaccessible disks are marked as failed and the disk group status changes to CRIT (critical) or FTDN (fault tolerant with a down disk). If the inaccessible disks later come online, they are marked as LEFTOVR (leftover).
- The `dequarantine` command is used to manually dequarantine the disk group. If the inaccessible disks later come online, they are marked as LEFTOVR (leftover). If event 172 was logged, do not use the `dequarantine` command. Instead follow the event's recommended-action text. If event 485 was logged, use the `dequarantine` command only as specified by the event's recommended-action text to avoid data corruption or loss.

When a disk group is dequarantined, event 173 is logged.

A quarantined disk group can be fully recovered if the inaccessible disks are restored. Make sure that all disks are properly seated, that no disks have been inadvertently removed, and that no cables have been unplugged. Sometimes not all disks in the disk group power up. Check that all enclosures have restarted after a power failure. If these problems are found and then fixed, the disk group recovers and no data is lost.

If the inaccessible disks cannot be restored (for example, they failed), and the disk group's status is FTDN or CRIT, and compatible spares are available to replace the inaccessible disks, reconstruction will automatically begin.

If a replacement disk (reconstruct target) is inaccessible at power up, the disk group becomes quarantined. When the disk is found, the disk group is dequarantined and reconstruction starts. If reconstruction was in process, it continues where it left off.

NOTE: The only commands allowed for a quarantined disk group are `dequarantine`, `delete vdisks`, and `remove disk-groups`. If you delete a quarantined disk group and its inaccessible disks later come online, the disk group will reappear as quarantined or offline and you must delete it again (to clear those disks).

Min. role `manage`

Syntax `dequarantine`
`disk-group disk-group`
`vdisk vdisk`

Parameters `disk-group disk-group`

The name or serial number of the disk group to remove from quarantine. A name that includes a space must be enclosed in double quotes.

`vdisk vdisk`

The name or serial number of the disk group to remove from quarantine. A name that includes a space must be enclosed in double quotes.

Example After determining that vdisk VD1 is quarantined, remove it from quarantine and re-check its status.

```
# show vdisks
Name ... Status ...
-----
VD1 ... QTDN ... (RAID 6 quarantined with a down disk)
-----

# dequarantine vdisk VD1
Info: Vdisk VD1 was dequarantined. (VD1)
Success: Command completed successfully. (2013-08-01 14:06:09)

# show vdisks
Name ... Status ...
-----
VD1 ... FTDN ... (RAID 6 fault tolerant with a down disk)
-----
```

- See also
- [show disk-groups](#)
 - [show vdisks](#)
 - [trust](#)

detach replication-volume

Description Prepares a secondary volume to be physically removed from a system.

When using the replication feature, if you chose to create a replication set's primary and secondary volumes in the primary system, you can perform the initial replication and then physically move the secondary volume's vdisk into the secondary system.

The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

Detached volumes remain associated with their replication sets but are not updated with replication data or with replication control information. When a volume is detached its status is shown as `Detached`.

NOTE: It is recommended that the vdisk that you are moving contains only secondary volumes and their snap pools. You are allowed to move other volumes along with secondary volumes and their snap pools, but be sure that you are doing so intentionally.

NOTE: If you intend to move a vdisk's enclosure and you want to allow I/O to continue to the other enclosures, it is best if it is at the end of the chain of connected enclosures. If the enclosure is in the middle of the chain, the enclosures must be cabled with no single point of failure, so that removing the enclosure does not prevent communication between other enclosures.

Min. role `manage`

Syntax `detach replication-volume`
`[set replication-set]`
`replication-volume`

Parameters `set replication-set`
Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the replication volume to detach. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Detach secondary volume `rV1`.

```
# detach replication-volume rV1
```

- See also
- [reattach replication-volume](#)
 - [show replication-sets](#)
 - [show replication-volumes](#)
 - [start vdisk](#)
 - [stop vdisk](#)

down disk

Description Simulates vdisk degradation due to loss of a disk. This command is not supported.

exit

Description Log off and exit the CLI session.

Min. role monitor

Syntax exit


expand disk-group

Description Adds disks to a disk group to expand its storage capacity. This command applies to linear storage only. The new disks must be the same type as disks already in the group and should also have the same capacity.

NOTE: If you upgraded from an earlier release that did not distinguish between enterprise and midline SAS disks, you might have groups that contain both types of disks. For those groups, you can designate either or both types of disks for expansion. If—through replacement of spares or failed disks—the group is changed to contain only one type of disk, you will only be able to add disks of that type to the group.

The expansion capability for each supported RAID level is:

RAID level	Expansion capability	Maximum disks
Non-RAID	Cannot expand.	1
0, 3, 5, 6	Can add 1–4 disks at a time.	16
1	Cannot expand.	2
10	Can add 2 or 4 disks at a time.	16
50	Can expand the group one RAID-5 subgroup at a time. The added RAID-5 subgroup must contain the same number of disks as each original subgroup.	32

 **IMPORTANT:** Disk group expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors.

Before starting the expansion, ensure no other utilities are running on the group. If another operation is in progress, the expansion cannot start.

Min. role manage

Syntax `expand disk-group
disks disks
[prompt yes|no]
disk-group`

Parameters `disks disks`

The IDs of the disks to add. For disk syntax, see "[Command syntax](#)" (page 23).

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

`disk-group`

The name or serial number of the disk group to expand. A name that includes a space must be enclosed in double quotes.

Example Expand disk group VD1 to include disk 1.11.

```
# expand disk-group disks 1.11 VD1
```

Expand RAID-10 disk group R10 to include an additional mirror pair.

```
# expand disk-group disks 2.9-10 R10
```

Expand RAID-50 disk group R50, which has four 3-disk subgroups, to include an additional subgroup.

```
# expand disk-group disks 2.1-2,2.5 R50
```

- See also
- [show disk-groups](#)
 - [show disks](#)

expand snap-pool

Description Expands a snap pool. This command applies to linear storage only.

Expansion is restricted to the space available on the vdisk containing the snap pool. If insufficient space is available for expansion on the vdisk, first expand the vdisk by using [expand vdisk](#).

Min. role manage

Syntax `expand snap-pool
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max
snap-pool`

Parameters `size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max`
Specifies either:

- The amount of space to add to the snap pool. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.
- max: Expand the snap pool to fill all available space in its vdisk.

snap-pool

The name or serial number of the snap pool to expand. A name that includes a space must be enclosed in double quotes.

Example Expand snap pool SP1 by 100 GB.

```
# expand snap-pool size 100GB SP1
```

See also

- [show snap-pools](#)
- [show vdisks](#)


expand vdisk

Description Adds disks to a vdisk to expand its storage capacity. This command applies to linear storage only. The new disks must be the same type as disks already in the vdisk and should also have the same capacity.

NOTE: If you upgraded from an earlier release that did not distinguish between enterprise and midline SAS disks, you might have vdisks that contain both types of disks. For those vdisks, you can designate either or both types of disks for expansion. If—through replacement of spares or failed disks—the vdisk is changed to contain only one type of disk, you will only be able to add disks of that type to the vdisk.

The expansion capability for each supported RAID level is:

RAID level	Expansion capability	Maximum disks
NRAID	Cannot expand.	1
0, 3, 5, 6	Can add 1–4 disks at a time.	16
1	Cannot expand.	2
10	Can add 2 or 4 disks at a time.	16
50	Can expand the vdisk one RAID-5 sub-vdisk at a time. The added RAID-5 sub-vdisk must contain the same number of disks as each original sub-vdisk.	32

 **IMPORTANT:** Vdisk expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors.

Before starting the expansion, ensure no other vdisk utilities are running on the vdisk. If another operation is in progress, the expansion cannot start.

Min. role manage

Syntax `expand vdisk
disks disks
[prompt yes|no]
vdisk`

Parameters `disks disks`

The IDs of the disks to add. For disk syntax, see "[Command syntax](#)" (page 23).

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to the confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

`vdisk`

The name or serial number of the vdisk to expand. A name that includes a space must be enclosed in double quotes.

Example Expand vdisk VD1 to include disk 1.11.

```
# expand vdisk disks 1.11 VD1
```

Expand RAID-10 vdisk R10 to include an additional mirror pair.

```
# expand vdisk disks 2.9-10 R10
```


Expand RAID-50 vdisk R50, which has four 3-disk sub-vdisks, to include an additional 3-disk sub-vdisk.

```
# expand vdisk disks 2.1-2,2.5 R50
```

- See also
- [show disks](#)
 - [show vdisks](#)

expand volume

Description Expands a standard volume or base volume.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

If overcommit is disabled, expansion is restricted to the space available in the pool that contains the volume. If overcommit is enabled, the volume size can exceed the physical capacity of the pool. The maximum volume size is 140 TB (128 TiB). To see whether overcommit is enabled, use the [show pools](#) command.

If insufficient space is available for expansion on the vdisk, first expand the vdisk by using [expand vdisk](#).

To expand a master volume:

1. Delete all of its snapshots by using [delete all-snapshots](#).
2. Convert it to a standard volume by using [convert master-to-std](#).
3. Expand the standard volume by using [expand volume](#).
4. Convert the expanded volume to a master volume by using [convert std-to-master](#).

Min. role manage

Syntax `expand volume
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max
volume`

Parameters `size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`

Specifies either:

- The amount of space to add the volume. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.
- `max`: Expand the volume to fill the available space in the vdisk.

`volume`

The name or serial number of the volume to expand. A name that includes a space must be enclosed in double quotes.

Example Expand standard volume V1 by 100 GB.

```
# expand volume size 100GB V1
```

- See also**
- [expand disk-group](#)
 - [expand snap-pool](#)
 - [expand vdisk](#)
 - [show volumes](#)

export snapshot

Description Exports a replication snapshot in the local system to a new standard snapshot. This command applies to linear storage only.

The standard snapshot will reside in the same snap pool, take a snapshot license, and be independent of the replication snapshot. The standard snapshot can be used like any other standard snapshot, and changes to it will not affect the replication snapshot.

The standard snapshot is subject to the snap pool's deletion policies. If the snap pool reaches its critical threshold, the snapshot may be deleted, even if it is mapped. If you want to preserve the snapshot's data, you can create a standard volume from the snapshot, as described in help for the [volumecopy](#) command.

The `export` command will not succeed if the replication snapshot is in a remote system or if the resulting snapshot would exceed license limits.

Min. role `manage`

Syntax `export snapshot`
 name standard-snapshot
 [*set replication-set*]
 replication-snapshot

Parameters *name standard-snapshot*
A name for the resulting snapshot. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

set replication-set

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

replication-snapshot

The name or serial number of the replication snapshot to export. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Export local replication snapshot `RepSnap1` to standard snapshot `Snap1`.

```
# export snapshot name Snap1 RepSnap1
```

See also

- [show replication-sets](#)
- [show snapshots](#)

fail

Description Forces the partner controller module to crash for a non-maskable interrupt. The command causes the crash by issuing an internal kill command to the Storage Controller in the partner controller module. This might be helpful to gather debug information that is only available via a crash dump.

△ **CAUTION:** Do not use this command in a production system. Use only for testing. This command will interfere with the operation of volumes in vdisks owned by the failed controller, potentially causing data loss.

Min. role manage

Syntax fail
controller a|b

Parameters controller a|b
Specifies whether to kill controller A or B. You cannot kill the controller on which the command is issued.

Example From controller A, fail controller B.

```
# fail controller b
```

See also • [unfail controller](#)

help

See "[Viewing help](#)" (page 25).

load license

Description Used by the WBI to install a license file to control use of licensed features.

See also • [show license](#)

map volume

Description Maps specified volumes using settings that override the volumes' default mapping.

When a volume is created, if no mapping settings are specified the volume is not mapped. Otherwise, those settings become its default mapping, which specifies the controller host ports and access level that all connected initiators have to the volume, and the LUN presented to all initiators to identify the volume. The default mapping's LUN is known as the volume's *default LUN*.

The `map volume` command creates mappings with different settings for different initiators. Optionally, you can specify the LUN, ports, and access level for a mapping. A mapping can make a volume accessible to initiators, or inaccessible to initiators (known as *masking*). For example, assume a volume's default mapping allows read-only access using LUN 5. You can give one initiator read-write access using LUN 6, and you can give a second initiator no access to the volume.

NOTE: You cannot map a replication set's secondary volume.

NOTE: When mapping a volume to an initiator using the Linux ext3 file system, specify read-write access. Otherwise, the file system will be unable to mount/present/map the volume and will report an error such as "unknown partition table."

Min. role `manage`

Syntax `map volume`
 `[access read-write|rw|read-only|ro|no-access]`
 `[host hosts]`
 `initiator initiators|hosts|host-groups`
 `[lun LUN]`
 `[ports ports]`
 `volumes|volume-groups`

Parameters `access read-write|rw|read-only|ro|no-access`
Optional. The access permission to use for the mapping: read-write (`rw`), read-only (`ro`), or no-access. If the access parameter is specified as read-write or read-only, the `lun` parameter must be specified. For an explicit mapping, `no-access` causes the volume to be masked from specified initiators. If the access parameter is omitted, access is set to `read-write`.

`host hosts`
Deprecated—use the `initiator` parameter instead.

`initiator initiators|hosts|host-groups`
Optional. A comma-separated list of initiators, hosts, or host groups to which to map the volumes. For `initiator`, `host`, and `host-group` syntax, see "[Command syntax](#)" (page 23). If the `initiator` parameter is specified, the `lun` and `ports` parameters must be specified. If the `initiator` parameter is omitted, the mapping applies to all initiators that are not explicitly mapped.

`lun LUN`
Optional. The LUN to use for the mapping. If a single volume and multiple initiators are specified, the same LUN is used for each initiator. If multiple volumes and a single initiator are specified, the LUN will increment for the second and subsequent volumes. If multiple volumes and initiators are specified, each initiator will have the same LUN for the first volume, the next LUN for the second volume, and so on. The `lun` parameter is ignored if `access` is set to `no-access`. If the `lun` parameter is omitted, the default LUN is presented.

ports ports

Optional. The controller host ports to use for the mapping. Any unspecified ports become unmapped. All specified ports must be the same type (FC, for example). For port syntax, see "[Command syntax](#)" (page 23). If the `ports` parameter is specified, the `lun` parameter must also be specified. The `ports` parameter is ignored if `access` is set to `no-access`. If the `ports` parameter is omitted, all ports are mapped.

volumes|volume-groups

A comma-separated list of the names or serial numbers of the volumes or volume groups to map. For volume and volume-group syntax, see "[Command syntax](#)" (page 23).

Example Map volume `v2` with read-only access to initiator `Init1`, using port `A1` and LUN `100`.

```
# map volume access ro ports a1 lun 100 initiator Init1 v2
```

Map volumes `v2` and `v3` with read-write access for `Init2`, using ports `A1` and `B1` and LUN `101`.

```
# map volume access rw ports a1,b1 lun 101 initiator Init2 v2,v3
```

Mask volume `v4` from `Init1` and `Init3`.

```
# map volume v4 access no-access initiator Init1,Init3
```

Map volumes `v1` and `v2` to initiators `Init1` and `Init2`, using ports `A1` and `B1` starting with LUN `6`, and view the results.

```
# map volume ports a1,b1 lun 6 initiator Init1,Init2 v1,v2
```

Map volume group `volGroupA` to host group `hostGroupA`, starting with LUN `1` on ports `A0` and `B0`.

```
# map volume volGroupA.* initiator hostGroupA.*.* lun 1 port A0,B0
```

- See also
- [show host-groups](#)
 - [show initiators](#)
 - [show maps](#)
 - [show ports](#)
 - [show volume-groups](#)
 - [show volumes](#)
 - [unmap volume](#)

meta

Description In XML API format only, shows all property metadata for objects. This includes data not shown in `brief` mode.

Min. role `monitor`

Syntax `meta basetypes`

Parameters *basetypes*

A basetype or a list of basetypes separated by commas (with no spaces) to specify the objects for which to show metadata. For names and descriptions of supported basetypes, see "[XML API basetype properties](#)" ([page 376](#)).

Example Show all metadata for objects returned by the `show disks` command:

```
# meta drives
```

See also • [set cli-parameters](#)

ping

Description Tests communication with a remote host. The remote host is specified by IP address. Ping sends ICMP echo response packets and waits for replies.

Min. role monitor

Syntax ping
 host-address
 [*count*]

Parameters *host-address*
The remote host's IP address in dotted decimal form.

count
Optional. The number of packets to send. The default is 4 packets. Use a small count because the command cannot be interrupted. The default is 4 packets.

Example Send two packets to the remote computer at 10.134.50.6.

```
# ping 10.134.50.6 2
```


reattach replication-volume

Description Reattaches a secondary volume to its replication set.

Reattaching a secondary volume is the last part of the process for moving a secondary volume from a primary system into a secondary system. The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

If the reattach operation succeeds, the secondary volume's status changes to `Establishing proxy` while it is establishing the connection to the remote (primary) system in preparation for replication. Then the status changes to `Online`. The replication set is ready to resume replication operations.

If the reattach operation fails and says it is unable to get the primary volume's link type, the vdisk that contains the secondary volume may not have completed its startup activities. Wait approximately one minute for these activities to complete, then retry the operation. If this message continues to occur, check the event log to better understand the condition and for an indication of how to correct it.

NOTE: If the secondary system does not support the link type that the replication set is configured to use, a message will say the reattach operation failed because it could not determine the secondary address. To fix this, repeat process steps 1 and 2 above to move the secondary volume into a system that supports the required link type.

Min. role `manage`

Syntax `reattach replication-volume`
`[remote-address ip=IPs | wwnn=WWNNs | wwpn=WWPNs]`
`[set replication-set]`
`replication-volume`

Parameters `remote-address ip=IPs | wwnn=WWNNs | wwpn=WWPNs`
Optional. Specifies host ports on the system where the secondary volume resides, by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.2.1:3260. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`set replication-set`
Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`
The name or serial number of the replication volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Reattach secondary volume `rV1`.

```
# reattach replication-volume rV1
```

- See also
- [detach replication-volume](#)
 - [show replication-sets](#)
 - [show replication-volumes](#)
 - [start vdisk](#)
 - [stop vdisk](#)

release volume

Description Clears initiator registrations and releases persistent reservations for all or specified volumes. Normally, reservations placed on volumes by initiators accessing those volumes can be released by host software. This command should be used only when the system is in an abnormal state, perhaps due to a configuration problem, and you need to remove all reservations for specified volumes and return them to a “clean” state.

△ **CAUTION:** Releasing reservations for volumes may allow unintended access to those volumes by other initiators, which may result in data corruption. Before issuing this command, quiesce all initiators that have visibility to the volumes whose reservations will be released.

Min. role manage

Syntax `release volume`
`all | volumes`

Parameters `all | volumes`
Specifies all volumes, or a comma-separated list of the names or serial numbers of specific volumes. A name that includes a space must be enclosed in double quotes.

Example Release reservations for a specific volume.

```
# release volume vd04_v0002
```

See also

- [show volume-reservations](#)
- [show volumes](#)

remote

Description Runs a command on a remote system that is associated with the local system. This command applies to linear storage only.

If the command cannot connect to remote controller A, it tries to connect to remote controller B. If it is unsuccessful, the remote command is not run. Output is displayed in console or XML API format depending on the local system's setting.

Min. role manage

Syntax remote
remote-system
command

Parameters *remote-system*
The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

command
The full name of any CLI command that is valid for the remote user's role.

Example Run the `show system` command on remote system System2.

```
# remote System2 show system
```

See also • [show remote-systems](#)

remove disk-groups

Description Removes specified disk groups.

△ CAUTION: Deleting a linear disk group will delete all data it contains.

For a linear disk group, if the group contains volumes, the command will prompt for confirmation to delete the volumes. If the reply is `yes`, the command will unmap and delete all volumes in the group, delete the group and corresponding pool, and make all the disks available. If the reply is `no`, the command will be canceled. You cannot delete a disk group if it contains a snap pool that is associated with a master volume in another disk group.

For a virtual disk group, if the group contains no volume data, the group will be removed. If the group contains volume data, the command will initiate removal and try to drain (move) all volume data to another group in the same pool. While data is being drained, the group's status will be `VDRAIN`. If there are no other disk groups in the pool or if no other disk group in the pool has enough space to contain the volume data, the command will immediately fail with an error. If draining begins and is successful, an event will be logged and the group will be removed. If draining begins but hosts continue to write new data to the volumes and cause an out-of-space condition, the command will fail and an event will be logged.

Also, if you remove the last disk group in a virtual pool, the command will prompt for confirmation to remove the pool, too. If the reply is `yes`, the pool will be removed. If the reply is `no`, the disk group and the pool will remain.

In one command you can delete linear and virtual disk groups, and disk groups from more than one pool.

NOTE: If you delete a quarantined disk group and its missing disks are later found, the group will reappear as quarantined or offline and you must delete it again (to clear those disks).

Min. role `manage`

Syntax `remove disk-groups`
`[prompt yes|no]`
`disk-groups`

Parameters `prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts, as when a utility is running on a disk group to be removed:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

disk-groups

A comma-separated list of the names or serial numbers of the disk groups to delete. A name that includes a space must be enclosed in double quotes.

Example Remove disk groups `dg1` and `dg2`.

```
# remove disk-groups dg1,dg2
```

Remove disk group `dg3`, which contains a volume.

```
# remove disk-groups dg3
```

```
Disk group dg3 has volumes present. Do you want to continue? no
```

Remove disk group `dg3`, on which a utility is running.

```
# remove disk-groups dg3
```

```
Pool dg3 has a job running. Do you want to continue? yes
```

Remove disk group dg4, which is the last disk group in pool B.

```
# remove disk-groups dg4  
All data on Pool B will be deleted.  
Do you want to continue? (y/n) yes
```

- See also
- [delete pools](#)
 - [delete vdisks](#)
 - [show disk-groups](#)
 - [show vdisks](#)

remove host-group-members

Description Removes specified hosts from a host group. You cannot remove all hosts from a group. At least one host must remain. The hosts are ungrouped but not deleted.

Min. role manage

Syntax `remove host-group-members
hosts hosts
host-group`

Parameters `hosts hosts`
A comma-separated list of the names of hosts to remove from the host group. A name that includes a space must be enclosed in double quotes.

`host-group`

The name of the host group. A name that includes a space must be enclosed in double quotes.

Example Remove two hosts from a group that contains three hosts.

```
# remove host-group-members hosts Host2,Host3 HostGroup1
```

See also

- [delete host-groups](#)
- [show host-groups](#)
- [show initiators](#)

remove host-members

Description Removes specified initiators from a host. You cannot remove all initiators from a host. At least one initiator must remain. The initiators are ungrouped but not deleted.

Min. role manage

Syntax `remove host-members
 initiators initiators
 host-name`

Parameters *initiators* *initiators*
A comma-separated list of the names of initiators to remove from the host. A name that includes a space must be enclosed in double quotes.

host-name

The name of the host. A name that includes a space must be enclosed in double quotes.

Example Remove two initiators from a group that contains three initiators.

```
# remove host-members initiators FC-init2,FC-init3 FC-host11
```

See also

- [delete hosts](#)
- [show initiators](#)

remove replication-volume

Description Removes a secondary volume from a replication set. This command applies to linear storage only.

The secondary volume is converted to a master volume. Any replication snapshots associated with that volume are converted to standard snapshots, regardless of the number of snapshots allowed by the system's license.

You must run this command on the primary system. You cannot remove the primary volume.

Min. role manage

Syntax `remove replication-volume`
[`nowait`]
[`primary-volume volume`]
[`set replication-set`]
`replication-volume`

Parameters `nowait`

Optional. Removing a volume from a replication set can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands.

`primary-volume volume`

Optional. Use only if the replication set has a primary-volume conflict. The name or serial number of the primary volume. A name that includes a space must be enclosed in double quotes.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the secondary volume to remove. A name that includes a space must be enclosed in double quotes. If the name is not unique within the replication set, the volume that is not the primary volume is removed. If the name is not unique across replication sets, specify the `set` parameter.

Example Remove secondary volume `rData` from a replication set.

```
# remove replication-volume rData
```

See also

- [show replication-sets](#)
- [show replication-volumes](#)

remove spares

Description Removes specified spares. You can remove global spares and dedicated spares (linear storage only) in the same command.

Min. role manage

Syntax `remove spares
 disks`

Parameters *disks*

The IDs of the spares to remove. For disk syntax, see "[Command syntax](#)" (page 23).

Example Remove dedicated spare 1.21 and global spare 1.22.

```
# remove spares 1.21-22
```

Remove global spare 1.22.

```
# remove spares 1.22
```

See also

- [add spares](#)
- [show disks](#)

remove volume-group-members

Description Removes volumes from a volume group. You cannot remove all volumes from a group. At least one volume must remain. The volumes are ungrouped but not deleted.

Min. role manage

Syntax `remove volume-group-members
volumes volume-IDs
volume-group`

Parameters `volumes volume-IDs`
A comma-separated list of the names or serial numbers of volumes to remove from the volume group. A name that includes a space must be enclosed in double quotes.

`volume-group`

The name of the volume group. A name that includes a space must be enclosed in double quotes.

Example Remove volumes Vol10002 and Vol10003 from volume group VolumeGroup1.

```
# remove volume-group-members volumes Vol10002,Vol10003 VolumeGroup1
```

See also

- [delete volume-groups](#)
- [show volume-groups](#)
- [show volumes](#)

replicate snapshot

Description Initiates a replication operation using an existing snapshot as the data source. This command applies to linear storage only.

This command replicates the specified external standard snapshot. If the specified snapshot has not already been replicated on the replication volume, the replication volume in the replication set is requested to replicate the snapshot data. Only snapshot preserved data is replicated. Snapshot modified data is not replicated.

If you instead want to create and replicate a snapshot as a single task, use the [replicate volume](#) command.

Min. role manage

Syntax `replicate snapshot`
 `[name replication-snapshot]`
 `[set replication-set]`
 `external-snapshot`

Parameters name *replication-snapshot*

Optional. A name for the resulting replication snapshot. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`external-snapshot`

The name or serial number of the external snapshot to use as the data source. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Replicate external snapshot Snap1 and name the resulting replication snapshot RepSnap1.

```
# replicate snapshot name RepSnap1 Snap1
```

See also

- [show replication-sets](#)
- [show snapshots](#)

replicate volume

Description Creates a replication snapshot of the specified volume and initiates a replication operation. This command applies to linear storage only.

This command can follow a [create replication-set](#) command that did not specify to initiate replication.

If the snapshot you want to replicate already exists, use the [replicate snapshot](#) command instead.

NOTE: If replication requests are sent to a secondary system whose temporary replication license has expired, the requests are queued but are not processed, and the secondary system reports event 472. If this condition occurs, check for this event in the event log, event-notification emails, and SNMP traps. To continue using replication, purchase a permanent replication license.

Min. role manage

Syntax `replicate volume`
`[preserve-snapshot external-snapshot]`
`[set replication-set]`
`snapshot replication-snapshot`
`volume`

Parameters `preserve-snapshot external-snapshot`

Optional. The name of the external snapshot to use as the source for this replication. This preserves the snapshot that is being used to replicate the volume as an external snapshot. Otherwise, the snapshot is converted to a replication snapshot. A name that includes a space must be enclosed in double quotes.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`snapshot replication-snapshot`

The name for the new replication snapshot. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`volume`

The name or serial number of the primary volume to replicate. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Replicate volume MV1 and name the replication snapshot RepSnap1.

```
# replicate volume snapshot RepSnap1 MV1
```

- See also**
- [show replication-sets](#)
 - [show replication-volumes](#)

rescan

Description This command forces rediscovery of disks and enclosures in the storage system. If both Storage Controllers are online and able to communicate with both expansion modules in each connected enclosure, this command rebuilds the internal SAS layout information, reassigns enclosure IDs based on controller A's enclosure cabling order, and ensures that the enclosures are displayed in the proper order. A manual rescan temporarily pauses all I/O processes, then resumes normal operation. It can take up to two minutes for the enclosure IDs to be corrected.

A manual rescan may be needed after system power-up to display enclosures in the proper order. Whenever you replace a drive chassis or controller chassis, perform a manual rescan to force fresh discovery of all drive enclosures connected to the controller enclosure.

A manual rescan is not needed after inserting or removing disks because the controllers automatically detect these changes. When disks are inserted they are detected after a short delay, which allows the disks to spin up

Min. role manage

Syntax rescan

Example Scan for device changes and re-evaluate enclosure IDs.

```
# rescan
```

reset all-statistics

Description Resets performance statistics for both controllers. You can specify either to reset all live statistics to zero, or to reset (clear) all historical performance statistics for all disks. If you reset historical statistics, an event will be logged and new data samples will continue to be stored every quarter hour.

Min. role manage

Syntax `reset all-statistics`
 `[historical]`
 `[prompt yes|no]`

Parameters `historical`

Optional. Specifies to reset historical statistics instead of live statistics. If this parameter is omitted, the command will reset live statistics instead of historical statistics.

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to the confirmation prompt that will appear if the historical parameter is specified:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If the historical parameter is specified and the prompt parameter is omitted, you must manually reply to the prompt. If the historical parameter is omitted, the prompt parameter has no effect. There is no confirmation prompt for live statistics.

Example Reset all live statistics for both controllers.

```
# reset all-statistics
```

Reset all historical disk-performance statistics for both controllers.

```
# reset all-statistics historical
```

```
This command will reset all historical disk statistics.
```

```
Do you want to reset? (y/n) yes
```

- See also**
- [reset controller-statistics](#)
 - [reset disk-error-statistics](#)
 - [reset disk-group-statistics](#)
 - [reset disk-statistics](#)
 - [reset host-port-statistics](#)
 - [reset pool-statistics](#)
 - [reset vdisk-statistics](#)
 - [reset volume-statistics](#)
 - [show controller-statistics](#)

reset controller-statistics

Description Resets performance statistics for controllers.

This command resets all controller statistics except Power On Time. To reset this, restart or power cycle a controller.

Min. role manage

Syntax `reset controller-statistics`
`[a|b|both]`

Parameters `a|b|both`
Optional. Specifies whether to reset statistics for controller A, B, or both. If this parameter is omitted, statistics are reset for both controllers.

Example Reset statistics for both controllers.

```
# reset controller-statistics
```

See also

- [reset all-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [reset volume-statistics](#)
- [show controller-statistics](#)

reset disk-error-statistics

Description Resets error statistics for all or specified disks. Statistics that are reset include:

- Number of SMART events recorded
- Number of I/O timeouts accessing the disk
- Number of times the disk did not respond
- Number of attempts by the controllers to spin up the disk
- Number of media errors (errors generated by the disk as specified by its manufacturer)
- Number of non-media errors (errors generated by the controllers or by the disk and not categorized as media errors)
- Number of block reassignments
- Number of bad blocks found

To reset other disk statistics, use the [reset disk-statistics](#) command.

Min. role `manage`

Syntax `reset disk-error-statistics`
`[disks]`

Parameters `disks`

Optional. The IDs of the disks for which to reset statistics. For disk syntax, see "[Command syntax](#)" ([page 23](#)). If this parameter is omitted, statistics are reset for all disks.

Example Reset error statistics for disks 1.1 and 2.1.

```
# reset disk-error-statistics 1.1,2.1
```

- See also
- [reset all-statistics](#)
 - [reset controller-statistics](#)
 - [reset disk-group-statistics](#)
 - [reset disk-statistics](#)
 - [reset host-port-statistics](#)
 - [reset pool-statistics](#)
 - [reset vdisk-statistics](#)
 - [reset volume-statistics](#)
 - [show disk-statistics](#)
 - [show disks](#)

reset disk-group-statistics

Description Clears resettable performance statistics for linear disk groups only, and resets timestamps for those statistics. This command behaves the same as the [reset vdisk-statistics](#) command.

Min. role manage

Syntax `reset disk-group-statistics
disk-groups`

Parameters *disk-groups*

Optional. A comma-separated list of the names or serial numbers of the disk group for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all disk groups.

Example Reset statistics for linear disk group dg1.

```
# reset disk-group-statistics dg1
```

See also

- [reset all-statistics](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [reset volume-statistics](#)
- [show disk-group-statistics](#)
- [show disk-groups](#)

reset disk-statistics

Description Resets performance statistics for disks.

This command resets basic disk statistics but not disk error statistics. To reset these, use the [reset disk-error-statistics](#) command.

Min. role manage

Syntax `reset disk-statistics`

Example Reset statistics for all disks.

```
# reset disk-statistics
```

See also

- [reset all-statistics](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [reset volume-statistics](#)
- [show disk-statistics](#)

reset host-link

Description Resets specified controller host ports (channels).

For FC, you can reset a single port. For an FC host port configured to use FC-AL (loop) topology, a reset issues a loop initialization primitive (LIP).

For iSCSI, you can reset a port pair (either the first and second ports or the third and fourth ports).

For SAS, you can reset a port pair (either the first and second ports or the third and fourth ports). Resetting a host port issues a COMINIT/COMRESET sequence and might reset other ports.

Min. role manage

Syntax `reset host-link
ports ports`

Parameters `ports ports`

A controller host port ID, a comma-separated list of IDs, a hyphenated range of IDs, or a combination of these. A port ID is a controller ID and port number, and is not case sensitive. Do not mix controller IDs in a range.

Example Reset the host link on port A1.

```
# reset host-link ports A1
```

See also • [show ports](#)

reset host-port-statistics

Description Resets performance statistics for controller host ports.

Min. role manage

Syntax `reset host-port-statistics`
`[ports ports]`

Parameters `ports ports`

Optional. The controller ID and port number of ports for which to reset statistics. For port syntax, see "[Command syntax](#)" ([page 23](#)). If this parameter is omitted, statistics are reset for all controller host ports.

Example Reset statistics for all controller host ports.

```
# reset host-port-statistics
```

- See also**
- [reset all-statistics](#)
 - [reset controller-statistics](#)
 - [reset disk-error-statistics](#)
 - [reset disk-group-statistics](#)
 - [reset disk-statistics](#)
 - [reset pool-statistics](#)
 - [reset vdisk-statistics](#)
 - [reset volume-statistics](#)
 - [show host-port-statistics](#)
 - [show ports](#)

reset pool-statistics

Description Clears resettable performance statistics for linear and virtual pools, and resets timestamps for those statistics.

Min. role manage

Syntax `reset pool-statistics`
`[pool]`

Parameters *pool*

Optional. The name or serial number of the pool for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all pools.

Example Reset statistics for pool A.

```
# reset pool-statistics A
```

See also

- [reset all-statistics](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [reset volume-statistics](#)
- [show pool-statistics](#)
- [show pools](#)

reset smis-configuration

Description Resets the SMI-S configuration files. For use by or with direction from a service technician.

This command will reset the configuration of the SMI-S service to default settings. After running this command, any hosts registered via SMI-S will need to be registered again.

Messages are displayed when the SMI-S configuration is reset and SMI-S is restarted.

Min. role manage

Syntax `reset smis-configuration`
`[a|b|both]`
`[prompt yes|no]`
`[noprompt]`

Parameters `a|b|both`

Optional. The controller module containing the controller to restart. If this parameter is omitted, the command affects the controller being accessed.

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must reply to the prompt.

`noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

Output Messages are displayed when the SMI-S configuration is reset and SMI-S is restarted.

Example Reset the SMI-S configuration on controller A, to which you are logged in.

```
# reset smis-configuration a
WARNING: The configuration of the SMIS service will be reset to default
settings. Any hosts registered via SMIS will need to be registered again. Are
you sure? (y/n) yes
```

From controller A, reset the SMI-S configuration on controller B.

```
# reset smis-configuration b
WARNING: The configuration of the SMIS service will be reset to default
settings. Any hosts registered via SMIS will need to be registered again. Are
you sure? (y/n) yes
```

Reset the SMI-S configuration on both Storage Controllers.

```
# reset smis-configuration both
WARNING: The configuration of the SMIS service will be reset to default
settings. Any hosts registered via SMIS will need to be registered again. Are
you sure? (y/n) yes
```

See also • [restore defaults](#)

reset snapshot

Description Replaces the data in a standard snapshot with the current data from its parent volume. The snapshot's volume characteristics are not changed.

Any snapshot in a snapshot tree can be reset, but the data source can only be the snapshot's immediate parent. For example, in the following snapshot tree:

```
Vol1
|- Vol1Snap
   |- Vol1SnapSnap
```

you can reset `Vol1Snap` to `Vol1`, or reset `Vol1SnapSnap` to `Vol1Snap`.

If the snapshot is mounted/presented/mapped to initiators for I/O, the command will prompt you to unmount/unpresent/unmap the snapshot before performing the reset. Leaving it mounted/presented/mapped can cause data corruption.

This command is not allowed for a replication snapshot.

△ **CAUTION:** All data represented by the snapshot as it exists prior to issuing this command will be lost.

Min. role `manage`

Syntax `reset snapshot`
 `[prompt yes|no]`
 `snapshot`

Parameters `prompt yes|no`
Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

snapshot

The name or serial number of the snapshot to reset. A name that includes a space must be enclosed in double quotes.

Example Reset snapshot `Vol1Snap`.

```
# reset snapshot Vol1Snap
You MUST unmount the snapshot from all hosts before resetting it.
Are you ready to continue? (y/n) yes
```

See also • [show snapshots](#)

reset vdisk-statistics

Description Resets performance statistics for all or specified vdisks. This command applies to linear storage only.

Min. role manage

Syntax `reset vdisk-statistics`
`[vdisks]`

Parameters *vdisks*

Optional. A comma-separated list of the names or serial numbers of the vdisks for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all vdisks.

Example Reset statistics for vdisks VD1 and MyVdisk.

```
# reset vdisk-statistics VD1,MyVdisk
```

See also

- [reset all-statistics](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset volume-statistics](#)
- [show vdisk-statistics](#)
- [show vdisks](#)

reset volume-statistics

Description Resets performance statistics for all or specified volumes.

Min. role manage

Syntax `reset volume-statistics`
`[volumes]`

Parameters *volumes*

Optional. A comma-separated list of the names or serial numbers of the volumes for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all volumes.

Example Reset statistics for volume `vd1_v0001`.

```
# reset volume-statistics vd1_v0001
```

- See also**
- [reset all-statistics](#)
 - [reset controller-statistics](#)
 - [reset disk-error-statistics](#)
 - [reset disk-group-statistics](#)
 - [reset disk-statistics](#)
 - [reset host-port-statistics](#)
 - [reset pool-statistics](#)
 - [reset vdisk-statistics](#)
 - [show volume-statistics](#)
 - [show volumes](#)

restart

Description Restarts the Storage Controller or Management Controller in a controller module.

If you restart a Storage Controller, it attempts to shut down with a proper failover sequence, which includes stopping all I/O operations and flushing the write cache to disk, and then the Storage Controller restarts. Restarting a Storage Controller restarts the corresponding Management Controller.

If you restart a Management Controller, communication with it is lost until it successfully restarts. If the restart fails, the partner Management Controller remains active with full ownership of operations and configuration information.

△ **CAUTION:** If you restart both Storage Controllers, both Management Controllers will also be restarted so all hosts and users will lose access to the system and its data until the restart is complete.

NOTE: When a Storage Controller is restarted, live performance statistics that it recorded will be reset. Historical performance statistics are not affected. In a dual-controller system, disk statistics may be reduced but will not be reset to zero, because disk statistics are summed between the two controllers. For more information, see help for commands that show statistics.

Min. role manage

Syntax restart
[a|b|both]
[noprompt]
sc|mc

Parameters a|b|both

Optional. The controller module containing the controller to restart. If this parameter is omitted, the command affects the controller being accessed.

noprompt

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

sc|mc

The controller to restart:

- sc: Storage Controller
- mc: Management Controller

Example Restart the Management Controller in controller A, to which you are logged in.

```
# restart mc a
```

```
During the restart process you will briefly lose communication with the  
specified Management Controller(s).
```

```
Do you want to continue? (y/n) yes
```

From controller A, restart the Storage Controller in controller B.

```
# restart sc b
```

Restart both Storage Controllers.

```
# restart sc both
```

```
While the specified Storage Controllers restart, communication will temporarily  
be lost with the corresponding Management Controllers.
```

```
Restarting both controllers can cause a temporary loss of data availability.
```

```
Do you want to continue? (y/n) yes
```

See also • [shutdown](#)

restore defaults

Description Restores the default configuration to the controllers. For use by or with direction from a service technician.

For details about which settings are restored see "[Settings changed by restore defaults](#)" (page 564). If the system contains only one controller module when the command is issued, the system's redundancy mode will be set to `Single Controller` mode.

△ **CAUTION:** This command changes how the system operates and might require some reconfiguration to restore host access to volumes.

Min. role `manage`

Syntax `restore defaults`
`[noprompt]`
`[prompt yes|no]`

Parameters `noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

Example Restore the controllers' default configuration.

```
# restore defaults
WARNING: The configuration of the array controller will be reset to default
settings. The Management Controller will restart once this is completed. Do you
want to continue? (y/n) yes
```

See also

- [reset smis-configuration](#)
- [restart](#)

resume replication

Description Resumes a suspended replication operation for the specified secondary volume. This command applies to linear storage only.

This command must be issued on the system that owns the secondary volume.

Min. role manage

Syntax `resume replication`
`[set replication-set]`
`replication-volume`

Parameters `set replication-set`
Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the secondary volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Resume replication of primary volume `v1` to secondary volume `rV1`.

```
# resume replication rV1
```

See also

- [abort replication](#)
- [show replication-sets](#)
- [show replication-volumes](#)

rollback master-volume (Deprecated)

Use [rollback volume](#).

rollback volume

Description Replaces the data in a parent volume with the data from one of its snapshots. This reverts the volume data to its state at an earlier point in time. The volume's characteristics are not changed.

Any parent volume in a snapshot tree can be rolled back, but the data source must be a direct child snapshot. For example, in the following snapshot tree:

```
Vol1
|- Vol1Snap
   |- Vol1SnapSnap
```

you can roll back Vol1 from Vol1Snap, or roll back Vol1Snap from Vol1SnapSnap.

If the parent volume is mounted/presented/mapped to initiators for I/O, the command will prompt you to unmount/unpresent/unmap the volume before performing the rollback. Leaving it mounted/presented/mapped can cause data corruption.

△ **CAUTION:** All data that differs between the parent volume and the snapshot will be lost. Create a snapshot of the parent volume as it currently exists before performing a rollback.

NOTE: For virtual storage, you cannot exclude modified write data in a snapshot from being used in a rollback. If you will want to do that, plan ahead and take a snapshot of the original snapshot before writing to it. Make the child snapshot read-only and use it for the rollback.

Min. role manage

Syntax `rollback volume`
 `[modifiedsnapshot yes|no]`
 `[prompt yes|no]`
 `snapshot snapshot`
 `volume`

Parameters `modifiedsnapshot yes|no`
Optional. Linear storage only. Specifies whether to include or exclude modified write data from the snapshot in the rollback.

- `yes`: Include modified snapshot.
- `no`: Exclude modified snapshot data.

If this parameter is omitted, modified snapshot data is excluded.

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must reply to the prompt.

`snapshot snapshot`

The name or serial number of the snapshot containing the data to roll back to. A name that includes a space must be enclosed in double quotes.

`volume`

The name or serial number of the volume to roll back. A name that includes a space must be enclosed in double quotes.

Example Roll back volume Vol1 from snapshot Vol1Snap.

```
# rollback volume snapshot Vol1Snap Vol1
```

You **MUST** unmount the volume and the snapshot from all hosts before starting a rollback operation.

```
Are you ready to continue? (y/n) yes
```

- See also
- [show snapshots](#)
 - [show volumes](#)

scrub disk-groups

Description Analyzes specified disk groups to find and fix disk errors.

This command acts on disks in a disk group but not dedicated spares or leftover disks. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

Disk-group scrub can last over an hour, depending on disk-group size, utility priority, and amount of I/O activity. However, a “foreground” scrub performed with this command is typically faster than a background scrub enabled with the [set advanced-settings](#) command. You can use a disk group while it is being scrubbed. To check the progress of a disk-group scrub (DRSC) job, use the `show disk-groups` command.

When a disk-group scrub job starts, event 206 is logged. When a scrub job ends, event 207 is logged and specifies whether errors were found and whether user action is required.

Min. role manage

Syntax `scrub disk-groups`
disk-groups

Parameters *disk-groups*

A comma-separated list of the names or serial numbers of the disk groups to scrub. A name that includes a space must be enclosed in double quotes.

Example Start scrubbing disk group dg1.

```
# scrub disk-groups dg1
```

See also

- [abort scrub](#) (with the `disk-group` parameter)
- [set advanced-settings](#)
- [show disk-groups](#)

scrub vdisk

Description Analyzes specified vdisks to find and fix disk errors.

This command acts on disks in a vdisk but not dedicated spares or leftover disks. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

Vdisk scrub can last over an hour, depending on vdisk size, utility priority, and amount of I/O activity. However, a “foreground” scrub performed with this command is typically faster than a background scrub enabled with the [set advanced-settings](#) command. You can use a vdisk while it is being scrubbed. To check the progress of a vdisk scrub (VRSC) job, use the [show vdisks](#) command.

When a vdisk scrub operation starts, event 206 is logged. When a vdisk scrub operation ends, event 207 is logged and specifies whether errors were found and whether user action is required.

Min. role `manage`

Syntax `scrub vdisk
vdisks`

Parameters `vdisks`

A comma-separated list of the names or serial numbers of the vdisks to scrub. A name that includes a space must be enclosed in double quotes.

Example Start scrubbing vdisk `vd1`.

```
# scrub vdisk vd1
```

See also

- [abort scrub](#) (with the `vdisk` parameter)
- [set advanced-settings](#)
- [show vdisks](#)

scrub volume

Description Analyzes specified volumes to find and fix disk errors. This command applies to linear storage only.

This command acts on the disk portions spanned by each volume, but it does not act on dedicated spares or leftover disks. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

Volume scrub can last over an hour, depending on volume size, utility priority, and amount of I/O activity. You can use a volume while it is being scrubbed. To check the progress of a volume scrub job, use the [show volumes](#) command.

NOTE: Only one scrub operation can be running on a vdisk at a time. If a manual scrub is started while a background scrub is in progress, the background scrub will terminate and will start over 24 hours after the manual scrub completes.

When a scrub is complete, event 207 is logged and specifies whether errors were found and whether user action is required.

Min. role manage

Syntax scrub volume
 volumes

Parameters *volumes*

The names or serial numbers of the volumes to scrub. A name that includes a space must be enclosed in double quotes.

Example Start scrubbing volume vol1.

```
# scrub volume vol1
```

See also

- [abort scrub](#) (with the volume parameter)
- [set advanced-settings](#)
- [show volumes](#)

set advanced-settings

Description Sets advanced system configuration parameters.

Min. role manage

Syntax `set advanced-settings`
[auto-stall-recovery enabled|disabled|on|off]
[auto-write-back enabled|disabled|on|off]
[background-disk-scrub enabled|disabled|on|off]
[background-scrub enabled|disabled|on|off]
[background-scrub-interval *interval*]
[compact-flash-failure enabled|disabled|on|off]
[controller-failure enabled|disabled|on|off]
[dynamic-spare enabled|disabled|on|off]
[emp-poll-rate *rate*]
[fan-failure enabled|disabled|on|off]
[host-cache-control enabled|disabled|on|off]
[independent-cache enabled|disabled|on|off]
[managed-logs enabled|disabled|on|off]
[missing-lun-response notready|illegal]
[partner-firmware-upgrade enabled|disabled|on|off]
[partner-notify enabled|disabled|on|off]
[power-supply-failure enabled|disabled|on|off]
[single-controller]
[smart enabled|disabled|on|off|detect-only]
[spin-down enabled|disabled|on|off]
[spin-down-delay *delay*]
[super-cap-failure enabled|disabled|on|off]
[sync-cache-mode immediate|flush]
[temperature-exceeded enabled|disabled|on|off]
[utility-priority low|medium|high]

Parameters `auto-stall-recovery enabled|disabled|on|off`

Optional. Detects situations where a controller stall is preventing I/O operations from completing, and recovers the system so that at least one controller is operational, thus avoiding data-unavailability situations. This feature focuses on Active-Active I/O stalls and failover/recovery stalls. When a stall is detected, event 531 is logged.

- `disabled` or `off`: Auto-stall recovery is disabled. The system will constantly perform auto-stall detection in the background but will not automatically perform recovery actions. This is the default.
- `enabled` or `on`: Auto-stall recovery is enabled. The system will constantly perform auto-stall detection in the background and automatically perform recovery actions.

`auto-write-back enabled|disabled|on|off`

Optional. Sets whether the cache mode will change from write-through to write-back when the trigger condition is cleared.

- `disabled` or `off`: Auto-write-back is disabled.
- `enabled` or `on`: Auto-write-back is enabled. This is the default.

`background-disk-scrub enabled|disabled|on|off`

Optional. Sets whether disks that are not in vdisks are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 72 hours. The first time you enable this parameter, background disk scrub will start with minimal delay. If you disable and then re-enable this parameter, background disk scrub will start 72 hours after the last background disk scrub completed.

- `disabled` or `off`: Background disk scrub is disabled. This is the default.
- `enabled` or `on`: Background disk scrub is enabled.

`background-scrub` `enabled|disabled|on|off`

Optional. Sets whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between background vdisk scrub finishing and starting again is specified by the `background-scrub-interval` parameter.

- `disabled` or `off`: Background vdisk scrub is disabled. This is the default.
- `enabled` or `on`: Background vdisk scrub is enabled.

`background-scrub-interval` *interval*

Optional. Sets the interval in hours between background vdisk scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.

`compact-flash-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation.

- `disabled` or `off`: The CompactFlash failure trigger is disabled.
- `enabled` or `on`: The CompactFlash failure trigger is enabled. This is the default.

`controller-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when a controller fails.

- `disabled` or `off`: The controller failure trigger is disabled. This is the default.
- `enabled` or `on`: The controller failure trigger is enabled.

`dynamic-spare` `enabled|disabled|on|off`

Optional. Sets whether the storage system will automatically designate an available compatible disk as a spare to replace a failed disk in a vdisk. A compatible disk has enough capacity to replace the failed disk and is the same type.

- `disabled` or `off`: The dynamic spares feature is disabled. This is the default.
- `enabled` or `on`: The dynamic spares feature is enabled.

`emp-poll-rate` *rate*

Optional. Sets the interval at which the storage system will poll each enclosure's Enclosure Management Processor (EMP) for status changes, from 5 to 3600 seconds. The default is 5 seconds.

`fan-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when a fan fails.

- `disabled` or `off`: The fan failure trigger is disabled. This is the default.
- `enabled` or `on`: The fan failure trigger is enabled.

`host-cache-control` `enabled|disabled|on|off`

Optional. Sets whether hosts are allowed to use the SCSI MODE SELECT command to change the storage system's write-back cache setting.

- `disabled` or `off`: Host control of caching is disabled. This is the default.
- `enabled` or `on`: Host control of caching is enabled.

`independent-cache` `enabled|disabled|on|off`

Optional. Sets the cache redundancy mode for a dual-controller storage system. For the change to take effect, you must restart both Storage Controllers.

- `disabled` or `off`: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. This is the default.
- `enabled` or `on`: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. You cannot enable this parameter if the `single-controller` parameter is enabled.

`managed-logs` `enabled|disabled|on|off`

Optional. Enables or disables the managed logs feature, which allows log files to be transferred from the storage system to a log collection system to avoid losing diagnostic data.

- `disabled` or `off`: The managed logs feature is disabled. This is the default.
- `enabled` or `on`: The managed logs feature is enabled.

`missing-lun-response` `notready|illegal`

Optional. Sets whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.

- `notready`: Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is `sensekey = 2`, `code = 4`, `qualifier = 3`. This option is the default.
- `illegal`: Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is `sensekey = 5`, `code = 25h`, `qualifier = 0`. If the system is used in a VMware environment, use this option.

`partner-firmware-upgrade` `enabled|disabled|on|off`

Optional. Sets whether component firmware versions are monitored and will be automatically updated on the partner controller.

- `disabled` or `off`: Partner firmware upgrade is disabled.
- `enabled` or `on`: Partner firmware upgrade is enabled. This is the default.

`partner-notify` `enabled|disabled|on|off`

Optional. Sets whether to notify the partner controller that a trigger condition occurred. Enable this option to have the partner also change to write-through mode for better data protection. Disable this option to allow the partner continue using its current caching mode for better performance. The default is `disabled`.

- `disabled` or `off`: Notification is disabled. This is the default.
- `enabled` or `on`: Notification is enabled.

`power-supply-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy automatically changes to write-through when a power supply fails.

- `disabled` or `off`: The power-supply failure trigger is disabled. This is the default.
- `enabled` or `on`: The power-supply failure trigger is enabled.

`single-controller`

Optional; for use by a service technician only. For a 2U12 or 2U24 system that had two controller modules but now has only one and is intended to be used as a single-controller system, this parameter changes the operating/redundancy mode to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP. You cannot enable this parameter if the `independent-cache` parameter is enabled.

`smart` `enabled|disabled|on|off|detect-only`

Optional. Enables or disables SMART (Self-Monitoring Analysis and Reporting Technology) monitoring for all disks in the storage system.

- `disabled` or `off`: Disables SMART for all disks in the system and for all disks added to the system.
- `enabled` or `on`: Enables SMART for all disks in the system and for all disks added to the system. This is the default.
- `detect-only`: Detects but does not change the SMART setting of each disk in the system, and for each new disk added to the system.

`spin-down` `enabled|disabled|on|off`

Optional. Sets whether available disks and global spares will spin down after a period of inactivity shown by the `spin-down-delay` parameter.

- `disabled` or `off`: Drive spin down for available disks and global spares is disabled. This is the default. Disabling spin down will set the `spin-down-delay` to 0.
- `enabled` or `on`: Drive spin down for available disks and global spares is enabled. If the `spin-down-delay` parameter is not specified, the delay will be set to 15 minutes.

NOTE: Drive spin down is not applicable to disks in virtual pools.

`spin-down-delay` `delay`

Optional. Sets the period of inactivity after which available disks and global spares will spin down. Setting the delay to 1–360 minutes will enable spin down. Setting the delay to 0 will disable spin down. The default is 15 minutes.

NOTE: Drive spin down is not applicable to disks in virtual pools.

`super-cap-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails.

- `disabled` or `off`: The supercapacitor failure trigger is disabled.
- `enabled` or `on`: The supercapacitor failure trigger is enabled. This is the default.

`sync-cache-mode` `immediate|flush`

Optional. Sets how the SCSI `SYNCHRONIZE CACHE` command is handled.

- `immediate`: Good status is returned immediately and cache content is unchanged. This option is the default.
- `flush`: Good status is returned only after all write-back data for the specified volume is flushed to disk.

`temperature-exceeded` `enabled|disabled|on|off`

Optional. Sets whether the system will shut down a controller when its temperature exceeds the critical operating range.

- `disabled` or `off`: The over-temperature trigger is disabled. This is the default.
- `enabled` or `on`: The over-temperature trigger is enabled.

`utility-priority` `low|medium|high`

Optional. Sets the priority at which data-redundancy utilities, such as `vdisk verify` and `reconstruct`, run with respect to I/O operations competing for the system's processors. (This does not affect `vdisk background scrub`, which always runs at “background” priority.)

- `high`: Utilities have higher priority than host I/O. Use when your highest priority is to return the system to a fully fault-tolerant state. This can cause heavy I/O to be slower than normal. This is the default.
- `medium`: Utility performance is balanced with host I/O performance.
- `low`: Utilities run at a slower rate with minimal effect on host I/O. Use when streaming data without interruption, such as for a web server, is more important than data redundancy.

Example Enable partner firmware upgrade.

```
# set advanced-settings partner-firmware-upgrade enabled
```

Enable managed logs.

```
# set advanced-settings managed-logs enabled
```

Enable auto-stall recovery.

```
# set advanced-settings auto-stall-recovery enabled
```

- See also
- [add spares](#)
 - [remove spares](#)
 - [scrub disk-groups](#)
 - [scrub vdisk](#)
 - [show advanced-settings](#)

set auto-write-through-trigger (Deprecated)

Use [set advanced-settings](#).

set awt (Deprecated)

Use [set advanced-settings](#).

set cache-parameters

Description Sets a volume's cache options. Settings you can change include:

NOTE: Only change the read-ahead cache settings if you fully understand how the host operating system, application, and adapter move data so that you can adjust the settings accordingly. Be prepared to monitor system performance and adjust read-ahead size until you find the optimal size for your application.

Min. role `manage`

Syntax `set cache-parameters`
`[optimization standard|no-mirror]`
`[read-ahead-size disabled|adaptive|stripe|512KB|1MB|2MB|4MB|8MB|16MB|32MB]`
`[write-policy write-back|write-through|wb|wt]`
`volume`

Parameters `optimization standard|no-mirror`
Optional. Sets the cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads. This is the default.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

`read-ahead-size disabled|adaptive|stripe|512KB|1MB|2MB|4MB|8MB|16MB|32MB`

Optional. Controls the use and size of read-ahead cache. You can optimize a volume for sequential reads or streaming data by changing the amount of data read in advance. Read ahead is triggered by sequential accesses to consecutive logical block address (LBA) ranges. Read ahead can be forward (increasing LBAs) or reverse (decreasing LBAs). Increasing the read-ahead size can greatly improve performance for multiple sequential read streams. However, increasing read-ahead size will likely decrease random read performance.

- `disabled`: Disables read ahead.
- `adaptive`: Enables adaptive read-ahead, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload. This is the default.
- `stripe`: Sets the read-ahead size to one stripe. The controllers treat non-RAID and RAID-1 vdisks internally as if they have a stripe size of 512 KB, even though they are not striped.
- `512KB, 1MB, 2MB, 4MB, 8MB, 16MB, or 32MB`: Sets a specific read-ahead size.

`write-policy write-back|write-through|wb|wt`

Optional. Sets the cache write policy, which determines when cached data is written to the disks. The ability to hold data in cache while it is being written to disk can increase storage device speed during sequential reads.

- `write-back` or `wb`: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default.
- `write-through` or `wt`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

You can configure the write policy to automatically change from write-back to write-through when certain environmental events occur, such as a fan failure. For details, see help for the [set advanced-settings](#) command.

`volume`

The name or serial number of the volume to change. A name that includes a space must be enclosed in double quotes.

Example Set the cache policy, optimization mode, and read-ahead size for volume V1.

```
# set cache-parameters write-policy wb optimization standard read-ahead-size  
stripe V1
```

See also

- [show cache-parameters](#)
- [show volumes](#)

set chap-record

Description For iSCSI, changes an originator's CHAP record. You can change the record's secret, mutual name, and mutual secret values. This command is permitted whether or not CHAP is enabled.

Min. role manage

Syntax `set chap-record`
`name originator-name`
`[secret originator-secret]`
`[mutual-name recipient-name mutual-secret recipient-secret]`

Parameters `name originator-name`

The originator name, typically in IQN format.

`secret originator-secret`

The secret that the recipient uses to authenticate the originator. The secret is case sensitive and can include 12–16 bytes.

`mutual-name recipient-name`

Optional; for mutual CHAP only. The recipient name, typically in IQN format. The name is case sensitive and can have a maximum of 223 bytes, including 0–9, lowercase a–z, hyphen, colon, and period. To determine a storage system's IQN, use the [show ports](#) command to view an iSCSI port Target ID value. This parameter and `mutual-secret` must be set together.

`mutual-secret recipient-secret`

Optional; for mutual CHAP only. The secret that the originator uses to authenticate the recipient. The secret is case sensitive, can include 12–16 bytes, and must differ from the originator secret. A storage system's secret is shared by both controllers. This parameter and `mutual-name` must be set together.

Example For mutual CHAP, add a recipient name and secret to a CHAP record.

```
# set chap-record name iqn.1991-05.com.microsoft:myhost.domain mutual-name
iqn.1995-03.com.acme:01.storage.00c0ffd6000a mutual-secret
ABCdef123456(2012-01-21 11:54:33)
```

- See also**
- [create chap-record](#)
 - [delete chap-records](#)
 - [show chap-records](#)
 - [show iscsi-parameters](#)
 - [show ports](#)

set cli-parameters

Description Sets options that control CLI behavior. If you are accessing the CLI through the network port, settings apply to the current CLI session only. If you are accessing the CLI through the enclosure's CLI port, settings persist across sessions.

The base, locale, precision, temperature scale, timeout, and units settings are read from the user's account, and can be overridden by using this command.

Min. role manage

Syntax `set cli-parameters`
[base 2|10]
[console|api|api-embed|ipa|json]
[brief enabled|disabled|on|off]
[locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t]
[management-mode v2|v3]
[pager enabled|disabled|on|off]
[precision #]
[storage-size-base 2|10]
[storage-size-precision #]
[storage-size-units auto|MB|GB|TB]
[temperature-scale celsius|c|fahrenheit|f]
[timeout #]
[units auto|MB|GB|TB]

Parameters base 2|10

Optional. Sets the base for entry and display of storage-space sizes:

- 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. In base 2 when you set a size, whether you specify a base-2 or base-10 size unit, the resulting size will be in base 2.
- 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. In base 10 when you set a size, the resulting size will be in the specified size unit. This option is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

`console|api|api-embed|ipa|json`

Optional. Sets the output format:

- `console`: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. This is the default.
- `api`: Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by COMP elements.
- `api-embed`: Alternate form of XML output which displays "child" objects embedded (indented) under "parent" objects.
- `ipa`: Alternate form of XML output.
- `json`: Alternate data-interchange format.

`brief enabled|disabled|on|off`

Optional.

- `enabled` or `on`: In XML output, this setting shows a subset of attributes of object properties. The `name` and `type` attributes are always shown.
- `disabled` or `off`: In XML output, this setting shows all attributes of object properties. This is the default.

`locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t`
Optional. The display language. The default is English.

`management-mode v2|v3`

Optional. For the current CLI session only, this sets the terminology to use in command output and system messages. This setting does not affect access to commands.

- `v2`: Uses terminology that is oriented to managing linear storage. For example, *vdisk* for disk groups and pools.
- `v3`: Uses terminology that is oriented to managing virtual and linear storage. For example, *disk group* for disk groups and *pool* for pools.

`pager enabled|on|disabled|off`

Optional.

- `enabled` or `on`: Halts output after each full screen to wait for keyboard input. This is the default.
- `disabled` or `off`: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.

`precision #`

Optional. Sets the number of decimal places (1–10) for display of storage-space sizes. The default is 1.

`storage-size-base 2|10`

Optional. Alias for `base`.

`storage-size-precision #`

Optional. Alias for `precision`.

`storage-size-units auto|MB|GB|TB`

Optional. Alias for `units`.

`temperature-scale celsius|c|fahrenheit|f`

Optional. Sets the scale for display of temperature values:

- `fahrenheit` or `f`: Temperatures are shown in degrees Fahrenheit.
- `celsius` or `c`: Temperatures are shown in degrees Celsius. This is the default.

`timeout #`

Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

`units auto|MB|GB|TB`

Optional. Sets the unit for display of storage-space sizes:

- `auto`: Sizes are shown in units determined by the system. This is the default.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

Based on the `precision` setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `units` is set to `TB`, `precision` is set to 1, and `base` is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.

Example Set CLI parameters.

```
# set cli-parameters timeout 600 console pager off precision 2 units GB
temperature-scale f
```

For scripting, display XML output in `api-embed` format and disable paging.

```
# set cli-parameters api-embed pager off
```

For scripting, display brief XML output in `api-embed` format and disable paging.

```
# set cli-parameters api-embed pager off brief on
```

Set the CLI to show output in console format.

```
# set cli-parameters console
```

Set the CLI to use the v3 management mode.

```
# set cli-parameters management-mode v3
```

See also • [show cli-parameters](#)

set controller-date

Description Sets the date and time parameters for the system. You can set the date and time manually or configure the system to communicate with a Network Time Protocol (NTP) server. Alternatively, you can configure NTP by using the [set ntp-parameters](#) command.

NOTE: If you specify valid NTP parameters and manual date/time parameters in the same command, the NTP parameters will take precedence. If the NTP server cannot be contacted, the date and time will not be changed and no error message will be displayed. If you specify the `timestamp` parameter and other manual date/time parameters in the same command, the `timestamp` parameter will take precedence.

Min. role manage

Syntax To set the date and time manually:

```
set controller-date
  jan|feb|mar|apr|may|jun|jul|aug|sep|oct|nov|dec
  day
  hh:mm:ss
  year
```

To set the date and time manually by specifying a timestamp:

```
set controller-date
  timestamp timestamp
  timezone +|-hh[:mm]
```

To configure use of NTP:

```
set controller-date
  ntp enabled|disabled|on|off
  ntpaddress IP-address
  timezone +|-hh[:mm]
```

Parameters `jan|feb|mar|apr|may|jun|jul|aug|sep|oct|nov|dec`
The month.

`day`
The day number (1–31).

`hh:mm:ss`
The hour (0–23), the minutes (0–59), and the seconds (0–59).

`year`
The year as a four-digit number.

`ntp enabled|disabled|on|off`
Enables or disables use of NTP. When NTP is enabled and the specified NTP server is available, each controller's time is synchronized with the server.

`ntpaddress IP-address`
The network address of an available NTP server.

`timezone +|-hh[:mm]`
The system's time zone as an offset in hours (-12 through +14) and optionally minutes (00–59) from Coordinated Universal Time (UTC). To specify a positive offset, the '+' is optional. To specify a negative offset, the '-' is required. The hour value can have one or two digits and can omit a leading zero. If the minutes value is specified it must have two digits. If it is omitted, the minutes value is set to 00.

`timestamp timestamp`
The date and time represented as the number of seconds (not counting leap seconds) that have elapsed since 1970-01-01 00:00:00 UTC. The resulting time will be in UTC, unless you also specify the `timezone` parameter.

Example Manually set the system time and date to 1:45 PM on September 22, 2011.

```
# set controller-date sep 22 13:45:0 2011
```

Manually set the system date and time to 4:30:50 PM on November 2, 2011 by specifying a timestamp and an offset for the Central Time zone.

```
# set controller-date timestamp 1320273050 timezone -6
```

Set the system to use NTP with an offset for the Mountain Time zone.

```
# set controller-date ntp enabled ntpaddress 69.10.36.3 timezone -7
```

Set the system to use NTP with an offset for the Bangalore, India, time zone.

```
# set controller-date ntp enabled ntpaddress 69.10.36.3 timezone +5:30
```

- See also
- [set ntp-parameters](#)
 - [show controller-date](#)
 - [show ntp-status](#)

set debug-log-parameters

Description Sets the types of debug messages to include in the Storage Controller debug log. For use by or with direction from technical support.

Min. role manage

Syntax `set debug-log-parameters
message-type+|- [...]`

Parameters `message-type+|-`

One of the following message types, followed by a plus (+) to enable or a minus (-) to disable inclusion in the log:

- `awt`: Auto-write-through cache triggers debug messages. Disabled by default.
- `bkcfg`: Internal configuration debug messages. Enabled by default.
- `cache`: Cache debug messages. Enabled by default.
- `capi`: Internal Configuration API debug messages. Enabled by default.
- `capi2`: Internal Configuration API tracing debug messages. Disabled by default.
- `disk`: Disk interface debug messages. Enabled by default.
- `dms`: Snapshot feature debug messages. Enabled by default.
- `emp`: Enclosure Management Processor debug messages. Enabled by default.
- `fo`: Failover and recovery debug messages. Enabled by default.
- `fruid`: FRU ID debug messages. Enabled by default.
- `hb`: Not used.
- `host`: Host interface debug messages. Enabled by default.
- `init`: Not used.
- `ioa`: I/O interface driver debug messages (standard). Enabled by default.
- `iob`: I/O interface driver debug messages (resource counts). Disabled by default.
- `ioc`: I/O interface driver debug messages (upper layer, verbose). Disabled by default.
- `iod`: I/O interface driver debug messages (lower layer, verbose). Disabled by default.
- `mem`: Internal memory debug messages. Disabled by default.
- `misc`: Internal debug messages. Enabled by default.
- `msg`: Inter-controller message debug messages. Enabled by default.
- `mui`: Internal service interface debug messages. Enabled by default.
- `ps`: Paged storage.
- `raid`: RAID debug messages. Enabled by default.
- `rcm`: Removable-component manager debug messages. Disabled by default.
- `res2`: Internal debug messages. Disabled by default.
- `resmgr`: Reservation Manager debug messages. Disabled by default.

Example Include RAID and cache messages, exclude EMP messages, and leave other message types unchanged.

```
# set debug-log-parameters raid+ cache+ emp-
```

See also • [show debug-log-parameters](#)

set disk

Description Performs a secure erase on a specified disk. This is called repurposing the disk, and only applies to a disk that is capable of Full Disk Encryption.

This command can only be run on disks whose status is either `AVAIL` or `UNUSABLE`. `AVAIL` disks have had all vdisk information removed from them. Secure erasing such disks is an extra step to make all data on the disk irretrievable. `UNUSABLE` disks have a foreign lock key. `UNUSABLE` disks can be imported by using the [set fde-import-key](#) command.

NOTE: If you want to repurpose more than one disk and the drive spin down (DSD) feature is enabled, disable DSD before repurposing the disks. You can re-enable it after the disks are repurposed. For information about disabling and enabling DSD for available disks, see information about the [set advanced-settings](#) command's `spin-down` parameter. Drive spin down is not applicable to disks in virtual pools.

Min. role `manage`

Syntax `set disk`
`[noprompt]`
`repurpose`
`disk`

Parameters `noprompt`
Optional in console format; required for XML API format. Suppresses the confirmation prompt that appears for `UNUSABLE` disks only. Specifying this parameter allows the command to proceed without user interaction.

`repurpose`
Specifies to secure erase the specified disk.

`disk`
The ID of the disk to be repurposed. Only one disk may be repurposed at a time. For disk syntax, see "[Command syntax](#)" ([page 23](#)).

Example In a system whose FDE security status is `Secured`, `Unlocked`, perform a secure erase of all data on disk 1.2, whose status is `AVAIL`.

```
# set disk 1.2 repurpose
```

In a system whose FDE security status is `Secured`, `Locked`, perform a secure erase of all data on disk 1.2, whose status is `UNUSABLE`.

```
# set disk 1.2 repurpose
Disk 1.2 was used on another system, and its contents are unknown. The contents
will be erased. Do you want to continue? (y/n) yes
```

See also

- [set fde-lock-key](#)
- [set fde-state](#)
- [show disks](#) (with the `fde` parameter)
- [show fde-state](#)

set disk-group

Description Changes parameters for a specified disk group.

Min. role manage


Syntax `set disk-group`
 `[name new-name]`
 `[owner a|b]`
 `[spin-down-delay delay]`
 `disk-group`

Parameters `name new-name`
Optional. A new name for the disk group. A name that includes a space must be enclosed in double quotes.

`owner a|b`

Optional for a linear disk group; prohibited for a virtual disk group. Sets the new owner: controller A or B.

△ CAUTION: Before changing the owning controller for a linear disk group, you must stop host I/O to its volumes. Volume mappings are not affected.

 IMPORTANT: Changing ownership of a disk group while any volumes in the disk group are mapped to live hosts is not supported and may cause data loss or unavailability. All volumes in the disk group must be unmapped or attached hosts must be shut down before the ownership of a disk group is changed.

`spin-down-delay delay`

Optional. Sets the period of inactivity after which the member disks and dedicated spares automatically spin down, from 1–360 minutes. Setting the delay to 1–360 minutes will enable spin down; setting the delay to 0 will disable spin down.

NOTE: Drive spin down affects disk operations as follows:

- Spun-down disks are not polled for SMART events.
 - Operations requiring access to disks may be delayed while the disks are spinning back up.
-

`disk-group`

Name or serial number of the disk group to change. A name that includes a space must be enclosed in double quotes.

Example Rename linear disk group `dg1` to `dg2` and set its spin-down delay to 10 minutes:

```
# set disk-group name dg2 spin-down-delay 10 dg1
```

See also • [show disk-groups](#)

set disk-parameters

Description Sets parameters that affect disk operation. Two features controlled by these parameters are disk Self-Monitoring Analysis and Reporting Technology (SMART) and drive spin down.

- Disks equipped with SMART technology can alert the controller of impending disk failure. When SMART is enabled, the system checks for SMART events one minute after a restart and every five minutes thereafter. SMART events are recorded in the event log. Changes to the SMART setting take effect after a rescan or a controller restart.
- The drive spin down feature monitors disk activity within system enclosures and spins down inactive disks, based on user-specified settings. This command sets spin-down parameters for available disks and global spares. To set spin-down parameters for a vdisk, use [set vdisk](#).

Drive spin down affects disk operations as follows:

- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

Min. role manage

Syntax `set disk-parameters`
[smart enabled|disabled|on|off|detect-only]
[spin-down enabled|disabled|on|off]
[spin-down-delay *delay*]

Parameters `smart enabled|disabled|on|off|detect-only`
Optional. Sets whether SMART is enabled or disabled for disks:

- `disabled` or `off`: Disables SMART for all disks in the system and for all disks added to the system.
- `enabled` or `on`: Enables SMART for all disks in the system and for all disks added to the system. This is the default.
- `detect-only`: Detects but does not change the SMART setting of each disk in the system, and for each new disk added to the system.

`spin-down enabled|disabled|on|off`

Optional. Sets whether available disks and global spares will spin down after a period of inactivity shown by the `spin-down-delay` parameter.

- `disabled` or `off`: Drive spin down for available disks and global spares is disabled. This is the default. Disabling spin down will set the spin-down delay to 0.
- `enabled` or `on`: Drive spin down for available disks and global spares is enabled. If the `spin-down-delay` parameter is not specified, the delay will be set to 15 minutes.

NOTE: Drive spin down is not applicable to disks in virtual pools.

`spin-down-delay delay`

Optional. Sets the period of inactivity after which available disks and global spares will spin down. Setting the delay to 1–360 minutes will enable spin down. Setting the delay to 0 will disable spin down. The default is 15 minutes.

NOTE: Drive spin down is not applicable to disks in virtual pools.

Example Enable SMART and drive spin down, and set the spin-down delay to 10 minutes.

```
# set disk-parameters smart on spin-down on spin-down-delay 10
```

See also • [show disk-parameters](#)

set email-parameters

Description Sets SMTP notification parameters for events and managed logs.

Min. role manage

Syntax `set email-parameters`
`domain domain`
`email-list email-addresses`
`[include-logs enabled|disabled|on|off]`
`notification-level crit|error|warn|info|none`
`sender sender`
`server server`

Parameters `domain domain`

The domain name that is joined with an @ symbol to the sender name to form the “from” address for remote notification. The domain name can have a maximum of 255 bytes. Because this name is used as part of an email address, do not include spaces. For example: MyDomain.com. If the domain name is not valid, some email servers will not process the mail.

`email-list email-addresses`

Enter up to four comma-separated email addresses for recipients of event notifications. Each email address can have a maximum of 320 bytes. The first three email addresses are used as destinations for events. If the managed logs feature is enabled, you can set the fourth email-address to the address of the log collection system. For example: IT-team@MyDomain.com, , , LogCollector@MyDomain.com

`include-logs enabled|disabled|on|off`

Optional. When the managed logs feature is enabled, this option activates the “push” mode, automatically attaching system log files to managed-logs email notifications that are sent to the log collection system. This option is disabled by default.

`notification-level crit|error|warn|info|none`

The minimum severity for which the system should send notifications:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables email notification. If this option is specified, no other parameters are required and their current values are not changed.

`sender sender`

The sender name that is joined with an @ symbol to the domain name to form the “from” address for remote notification. This name provides a way to identify the system that is sending the notification. The sender name can have a maximum of 64 bytes. Because this name is used as part of an email address, do not include spaces. For example: Storage-1.

`server server`

The IP address of the SMTP mail server to use for the email messages.

Example Set the system to send an email from RAIDsystem@mydomain.com to both sysadmin@mydomain.com and JSmith@domain2.com when a non-Informational event occurs, and to send an email with attached logs to logcollector@mydomain.com when logs need to be transferred.

```
# set email-parameters server 10.1.1.10 sender RAIDsystem domain mydomain.com
notification-level warn include-logs enabled email-list
sysadmin@mydomain.com,JSmith@domain2.com,,logcollector@mydomain.com
```

See also

- [show email-parameters](#)
- [test](#) (with the email parameter)

set enclosure

Description Sets an enclosure's name, location, rack number, and rack position. Set these parameters to values that help you identify and locate the enclosure. These values are used when user interfaces show enclosure-related data, such as in output of the [show enclosures](#) command and in event-log entries related to enclosures.

Min. role manage

Syntax `set enclosure`
 `[name new-name]`
 `[location location]`
 `[rack-number rack-number]`
 `[rack-position rack-position]`
 `enclosure-number`

Parameters name *new-name*

Optional. A new name for the enclosure. Input rules:

- The value is case sensitive.
- The value can have a maximum of 20 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

location *location*

The location of the enclosure. Input rules:

- The value is case sensitive.
- The value can have a maximum of 20 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

rack-number *rack-number*

The number of the rack containing the enclosure, from 0 to 255.

rack-position *rack-position*

The enclosure's position in the rack, from 0 to 255.

enclosure-number

The enclosure ID.

Example Set parameters for enclosure 1.

```
# set enclosure 1 name Storage-5 location Lab rack-number 9 rack-position 3
```

See also • [show enclosures](#)

set expander-fault-isolation

Description Temporarily disables PHY fault isolation for a specific Expander Controller. For use by or with direction from technical support.

By default, the Expander Controller in each I/O module performs fault-isolation analysis of SAS expander PHY statistics. When one or more error counters for a specific PHY exceed the built-in thresholds, the PHY is disabled to maintain storage system operation.

While troubleshooting a storage system problem, a service technician can use this command to temporarily disable fault isolation for a specific Expander Controller in a specific enclosure.

NOTE: If fault isolation is disabled, be sure to re-enable it before placing the system back into service. Serious problems can result if fault isolation is disabled and a PHY failure occurs.

Min. role manage

Syntax `set expander-fault-isolation`
 `[controller a|b|both]`
 `enabled|disabled|on|off`
 `[encl enclosure-ID]`
 `[wnn enclosure-wnn]`

Parameters `controller a|b|both`

Optional. The I/O module containing the Expander Controller whose setting you want to change: A, B, or both. If this parameter is omitted, the setting is changed in both I/O modules.

`enabled|disabled|on|off`

Specifies whether to enable or disable PHY fault isolation.

`encl enclosure-ID`

Optional. The enclosure ID of the enclosure containing the PHY. Specify either this parameter or the `wnn` parameter.

`wnn enclosure-wnn`

Optional. The WWN of the enclosure containing the PHY. Specify either this parameter or the `encl` parameter.

Example Disable PHY fault isolation for Expander Controller A in an enclosure.

```
# set expander-fault-isolation encl 0 controller a disabled
```

Re-enable PHY fault isolation for Expander Controller A in the same enclosure.

```
# set expander-fault-isolation encl 0 controller a enabled
```

See also

- [set expander-phy](#)
- [show enclosures](#)
- [show expander-status](#)

set expander-phy

Description Disables or enables a specific PHY. For use by or with direction from technical support.

Min. role manage

Syntax `set expander-phy
controller a|b|both
enabled|disabled|on|off
[encl enclosure-ID]
phy phy-ID
type drive|sc-0|sc-1|ingress|egress|drawer0-ingress|drawer0-egress|
drawer1-ingress|drawer1-egress|drawer2-ingress|drawer2-egress
[wwn enclosure-wwn]`

Parameters `controller a|b|both`

The I/O module containing the PHY to enable or disable: A, B, or both.

`enabled|disabled|on|off`

Whether to enable or disable the specified PHY.

`encl enclosure-ID`

Optional. The enclosure ID of the enclosure containing the PHY. Specify either this parameter or the `wwn` parameter.

`phy phy-ID`

The logical PHY number.

`type drive|sc-0|sc-1|ingress|egress|drawer0-ingress|drawer0-egress|
drawer1-ingress|drawer1-egress|drawer2-ingress|drawer2-egress`

The PHY type:

- `drive`: PHY connected to a disk drive.
- `sc-0`: PHY in the ingress bus to the local Storage Controller.
- `sc-1`: PHY in the ingress bus to the partner Storage Controller.
- `ingress`: PHY in an ingress port.
- `egress`: PHY in an egress port.
- `sc-0`: PHY in the ingress bus to the local Storage Controller.
- `sc-1`: PHY in the ingress bus to the partner Storage Controller.
- `drawer0-ingress`: Ingress PHY for drawer 0.
- `drawer0-egress`: Egress PHY for drawer 0.
- `drawer1-ingress`: Ingress PHY for drawer 1.
- `drawer1-egress`: Egress PHY for drawer 1.
- `drawer2-ingress`: Ingress PHY for drawer 2.
- `drawer2-egress`: Egress PHY for drawer 2.

`wwn enclosure-wwn`

Optional. The WWN of the enclosure containing the PHY. Specify either this parameter or the `encl` parameter.

Example Disable the first egress PHY in controller A.

```
# set expander-phy encl 0 controller a type egress phy 0 disabled
```

Enable the PHY for disk 5 in controller B.

```
# set expander-phy encl 0 controller b type drive phy 5 enabled
```

In a 2U48 enclosure, disable the PHY for disk 47 in both controllers.

```
# set expander-phy encl 0 controller both phy 47 type drive disabled
```


- See also
- [set expander-fault-isolation](#)
 - [show enclosures](#)
 - [show expander-status](#)

set fde-import-key

Description Sets or changes the import lock key for the use of Full Disk Encryption. The import lock key is derived from the passphrase and is used to unlock secured disks that are inserted into the system from a different secure system.

Min. role manage

Syntax `set fde-import-key`
 `[noprompt]`
 `passphrase value`

Parameters `noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires that the passphrase be re-entered. Specifying this parameter allows the command to proceed without user interaction.

`passphrase value`

A customer-supplied password associated with securing the system. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: , <> \ (Any double-quote characters in the passphrase are automatically removed.)
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

Example Set an import lock key in order to import locked disks from another secure system:

```
# set fde-import-key passphrase "Customer lock--01/10/2014"  
Please re-enter the import passphrase to confirm. "Customer lock--01/10/2014"
```

- See also**
- [clear fde-keys](#)
 - [set fde-lock-key](#)
 - [set fde-state](#)
 - [show fde-state](#)

set fde-lock-key

Description Sets or changes the lock key for the use of Full Disk Encryption. The lock key is derived from the passphrase and stored within the system.

You must retain the value of the passphrase and the lock key ID that the command returns. If you lose the passphrase, you could be locked out of your data.

Min. role manage

Syntax `set fde-lock-key`
 `[current-passphrase value]`
 `[noprompt]`
 `passphrase value`

Parameters `current-passphrase value`

Optional. If the system is secured, the current passphrase can be provided when using the `noprompt` option. The command will prompt for this current passphrase if it is not supplied.

`noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires that the passphrase be re-entered. Specifying this parameter allows the command to proceed without user interaction.

`passphrase value`

A customer-supplied password associated with securing the system. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: , < > \ (Any double-quote characters in the passphrase are automatically removed.)
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

Example Set a lock key in preparation for securing the system using FDE.

```
# set fde-lock-key passphrase "Customer lock--01/10/2014"  
Please re-enter the passphrase to confirm. Be sure to retain the passphrase  
value. "Customer lock--01/10/2014"
```

- See also**
- [clear fde-keys](#)
 - [set fde-import-key](#)
 - [set fde-state](#)
 - [show fde-state](#)

set fde-state

Description Changes the overall state of the system for the use of Full Disk Encryption. The system can be secured, where each disk becomes secured and not accessible outside the system. Alternatively, the system can be repurposed, where each disk is secure erased.

Min. role manage

Syntax `set fde-state`
`[noprompt]`
`[repurpose]`
`[secure passphrase value]`

Either the `repurpose` parameter or the `secure` parameter must be specified.

Parameters `noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires that the passphrase be re-entered. Specifying this parameter allows the command to proceed without user interaction.

`repurpose`

Optional. The system will be repurposed, which secure erases all disks. Before issuing the command, all data (such as volumes and vdisks) must be deleted from the disks.

`secure passphrase value`

Optional. The system and all its disks will become secured, using the specified FDE system passphrase, which must have been previously configured. A value that includes a space must be enclosed in double quotes. If the disks are not all FDE-capable the command will fail, and no changes will be made.

Example Secure the system using Full Disk Encryption.

```
# set fde-state secure passphrase "Customer lock--01/10/2014"  
Please re-enter the passphrase to confirm. "Customer lock--01/10/2014"
```

See also

- [clear fde-keys](#)
- [set fde-import-key](#)
- [set fde-lock-key](#)
- [show fde-state](#)

set global-spare (Deprecated)

Use [add spares](#).

set host

Description Sets the name of a host.

Min. role manage

Syntax `set host`
 `[name new-name]`
 `host-name`

Parameters `name new-name`

Optional. Changes the host's nickname to the specified name. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes

`host-name`

The current name of the host. A value that includes a space must be enclosed in double quotes.

Example Change the name of Host1 to MyHost.

```
# set host name MyHost Host1
```

See also • [show initiators](#)

set host-group

Description Sets the name of a host group.

Min. role manage

Syntax `set host-group`
 name *new-name*
 host-group

Parameters name *new-name*

A new name for the host group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes

host-group

The current name of the host group. A value that includes a space must be enclosed in double quotes.

Example Change the name of HostGroup1 to MyHostGroup.

```
# set host-group name MyHostGroup HostGroup1
```

See also • [show host-groups](#)

set host-name (Deprecated)

Use [set initiator](#).

set host-parameters

Description Sets controller host-port parameters for communication with attached hosts. FC and iSCSI ports can be configured. There are no parameters for SAS ports.

Host ports can be configured as FC or iSCSI ports. FC ports support use of qualified 8-Gbit/s or 16-Gbit/s SFPs. You can set FC ports to auto-negotiate the link speed or to use a specific link speed. iSCSI ports support use of qualified 1-Gbit/s or 10-Gbit/s SFPs. iSCSI port speeds are auto-negotiated.

Attempting to change FC loop IDs requires restarting the controllers; otherwise, new settings take effect without restarting the controllers.

Min. role manage

Syntax To set FC-port parameters:

```
set host-parameters
  [controller a|b|both]
  [fibre-connection-mode loop|point-to-point|auto]
  [fibre-loop-id values]
  [noprompt]
  [ports ports|all]
  [prompt yes|no|expert]
  [speed 4g|8g|16g|auto]
```

To set iSCSI-port parameters:

```
set host-parameters
  [controller a|b|both]
  [default-router address]
  [gateway address]
  [ip address]
  [iscsi-ip-version ipv4|ipv6]
  [netmask address]
  [noprompt]
  [ports ports|all]
  [prompt yes|no|expert]
```

Parameters `controller a|b|both`
Deprecated—use the `ports` parameter instead.

`fibre-connection-mode loop|point-to-point|auto`
Optional. For FC, sets the topology for the specified ports to:

- `loop`: Fibre Channel-Arbitrated Loop (public or private).
- `point-to-point`: Fibre Channel point-to-point. This is the default.
- `auto`: Automatically sets the mode based on the detected connection type.

You must also specify the `ports` parameter.

`fibre-loop-id values`

Optional. For FC, specifies comma-separated loop ID values to request for host ports when controllers arbitrate during a LIP. Use this option if you want ports to have specific addresses, if your system checks addresses in reverse order (lowest address first), or if an application requires that specific IDs be assigned to recognize the controller. If the loop ID is changed for one port, the same ID is used for other ports in the same controller. If the `ports` parameter is specified, loop IDs are set based on the controllers that the ports are in. You cannot specify the same value for ports on different controllers.

- `soft` or `255`: Soft target addressing enables the LIP to determine the loop ID. Use this setting if the loop ID is permitted to change after a LIP or power cycle.
- `0–125`: Specify a hard target address if you do not want the loop ID to change after a LIP or power cycle. If the port cannot acquire the specified ID, it is assigned a soft target address.

You must restart affected controllers to make loop ID changes take effect.

`default-router address`

Optional. For iSCSI IPv6 only, the default router for the port IP address.

`gateway address`

Optional. For iSCSI, the port gateway address.

`ip address`

Optional. For iSCSI, the port IP address. Ensure that each iSCSI host port in the storage system is assigned a different IP address.

`iscsi-ip-version ipv4|ipv6`

Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing controller iSCSI ports. When you change this setting, iSCSI-port address values are converted to the new format.

- `ipv4`: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values without leading zeroes and the octets are separated by a period. For example, `10.132.2.205`. The first octet may not be zero, with the exception that `0.0.0.0` can be used to disable the interface (stop I/O). This option is the default.
- `ipv6`: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, `0000:0000:0000:0000:0000:0000:0A90:3442`.

`netmask address`

Optional. For iSCSI IPv4 only, the subnet mask for the port IP address.

`noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

`ports ports|all`

Optional. Specific host port numbers or all ports. For port syntax, see "[Command syntax](#)" (page 23).

`prompt yes|no|expert`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.
- `expert`: Allow the command to proceed.

If this parameter is omitted, you must manually reply to the prompt.

`speed 4g|8g|16g|auto`

Optional. For FC, sets a forced link speed in Gbit/s or lets the speed be auto-negotiated (`auto`). Because a speed mismatch prevents communication between the port and host, set a speed only if you need to force the port to use a known speed for testing, or you need to specify a mutually supported speed for more than two FC devices connected in an arbitrated loop.

Example On a system with FC ports, set the link speed to 8 Gbit/s for ports A1 and B1.

```
# set host-parameters speed 8g ports a1,b1
WARNING: This change will take effect immediately. Changes may affect access to
data.
Do you want to continue? (y/n) yes
```

On a system with FC ports, set the link speed to `auto` for ports A1 and B1 and suppress the confirmation prompt.

```
# set host-parameters speed auto ports a1,b1 noprompt
```

On a system with iSCSI ports using IPv4 addressing, change the IP address of port A3.

```
# set host-parameters ip 10.134.50.6 ports a3
WARNING: This change will take effect immediately. Changes may affect access to
data.
Do you want to continue? (y/n) yes
```


On a system with iSCSI ports, specify to use IPv6 addressing and change the IP address and default router for port A1.

```
# set host-parameters ports A1 iscsi-ip-version ipv6 ip ::8576:246a
default-router ::0a0a:1
```

WARNING: This change will take effect immediately. Changes may affect access to data.

Do you want to continue? (y/n) **yes**

- See also
- [restart](#)
 - [set host-port-mode](#)
 - [set iscsi-parameters](#)
 - [show ports](#)

set host-port-mode

Description Changes host-interface characteristics for host ports in a CNC controller module. For both controller modules, all ports can be set to FC, all ports can be set to iSCSI, or the first two ports in each controller module can be set to FC and the second two ports can be set to iSCSI.

This command will immediately restart the controllers and log event 236. After the controllers have restarted, you can use the `set host-parameters` command to configure the individual ports.

Min. role manage

Syntax `set host-port-mode`
[FC|iSCSI|FC-and-iSCSI]
[noprompt]

Parameters FC|iSCSI|FC-and-iSCSI
Sets the port mode for each controller.

- FC: Sets all ports to FC.
- iSCSI: Sets all ports to iSCSI.
- FC-and-iSCSI: Sets the first two ports to FC and the second two ports to iSCSI.

`noprompt`

Optional in console format; required for XML API format. Suppresses the confirmation prompt, which warns that both controllers will be restarted. Specifying this parameter allows the command to proceed without user interaction.

Example For both controllers, set all ports to use iSCSI protocol.

```
# set host-port-mode iSCSI
```

This command will change host port configuration, stop I/O, and restart both controllers. Do you want to continue? (y/n) **y**

For both controllers, set the first two ports to use FC protocol and the second two ports to use iSCSI protocol.

```
# set host-port-mode FC-and-iSCSI
```

This command will change host port configuration, stop I/O, and restart both controllers. Do you want to continue? (y/n) **y**

See also

- [set host-parameters](#)
- [show ports](#)

set initiator

Description Sets the name of an initiator.

Min. role manage

Syntax `set host`
 `[id initiator]`
 `[nickname name]`

Parameters `id initiator`

The ID of the initiator. For FC the ID is a WWPN. For SAS the ID is a WWPN. A WWPN can include a colon between each byte but the colons will be discarded. For iSCSI the ID is an IQN.

`nickname name`

Optional. Sets the name of the initiator to the specified name. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes

Example For FC initiator 21000024ff3dfed1, set its name to FC-port1.

```
# set initiator nickname FC-port1 id 21000024ff3dfed1
```

See also • [show initiators](#)

set iscsi-parameters

Description For iSCSI, changes system-wide iSCSI parameters.

Min. role manage

Syntax `set iscsi-parameters`
`[chap enabled|disabled|on|off]`
`[iscsi-ip-version ipv4|ipv6]`
`[isns enabled|disabled|on|off]`
`[isns-alt-ip iSNS-IP]`
`[isns-ip iSNS-IP]`
`[jumbo-frame enabled|disabled|on|off]`
`[speed auto|1gbps]`

Parameters `chap enabled|disabled|on|off`
Optional. Enables or disables use of Challenge Handshake Authentication Protocol. Disabled by default.

`iscsi-ip-version ipv4|ipv6`
Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing controller iSCSI ports.

- `ipv4`: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values without leading zeroes and the octets are separated by a period. For example, `10.132.2.205`. This option is the default.
- `ipv6`: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, `0000:0000:0000:0000:0000:0000:0A90:3442`.

`isns enabled|disabled|on|off`
Optional. Enables or disables registration with a specified Internet Storage Name Service server, which provides name-to-IP-address mapping. Disabled by default.

`isns-alt-ip iSNS-IP`
Optional. Specifies the IP address of an alternate iSNS server, which can be on a different subnet. The default address is all zeroes.

`isns-ip iSNS-IP`
Optional. Specifies the IP address of an iSNS server. The default address is all zeroes.

`jumbo-frame enabled|disabled|on|off`
Optional. Enables or disables support for jumbo frames. A normal frame can contain 1500 bytes whereas a jumbo frame can contain a maximum of 9000 bytes for larger data transfers. Use of jumbo frames can succeed only if jumbo-frame support is enabled on all network components in the data path. Disabled by default.

`speed auto|1gbps`
Not supported.

Example For a storage system using IPv4 addressing whose host ports are connected to different subnets, enable CHAP, specify the IP address of the iSNS server on each subnet, and enable registration with either server.

```
# set iscsi-parameters chap enabled isns enabled isns-ip 10.10.10.93 isns-alt-ip 10.11.10.90
```

Specify that iSCSI ports will use IPv6 addressing.

```
# set iscsi-parameters iscsi-ip-version ipv6
```

See also

- [set host-parameters](#)
- [show iscsi-parameters](#)

set job-parameters (Deprecated)

Use [set advanced-settings](#).

set led

Description Changes the state of the identification LED on a specified device. LEDs are described in the Setup Guide.

Min. role manage

Syntax To set a disk LED:

```
set led
  disk ID
  enable|disable|on|off
```

To set the LEDs for an enclosure and its I/O modules:

```
set led
  [controller a|b]
  enable|disable|on|off
  enclosure ID
```

To set a drawer LED:

```
set led
  drawer ID
  enable|disable|on|off
```

Parameters controller a|b

Optional; for use with the enclosure parameter. Specifies the I/O module to locate. This affects the unit locator LED on the I/O module and on the enclosure's right ear.

disk *ID*

Specifies the disk to locate. For disk syntax, see ["Command syntax" \(page 23\)](#). This affects the fault LED.

drawer *ID*

Specifies the drawer to locate in a 2U48 enclosure. This affects the drawer locator LED. For drawer syntax, see ["Command syntax" \(page 23\)](#).

enable|disable|on|off

Specifies to set or unset the LED.

enclosure *ID*

Specifies the enclosure to locate. This affects the unit locator LED on the enclosure's right ear and on each I/O module.

Example Identify disk 5 in enclosure 1.

```
# set led disk 1.5 on
```

Stop identifying enclosure 1.

```
# set led enclosure 1 off
```

Identify controller B in enclosure 1.

```
# set led enclosure 1 controller b on
```

Identify drawer 1 in enclosure 1.

```
# set led drawer 1.1 on
```

set network-parameters

Description Sets parameters for controller module network ports.

You can manually set static IP values for each controller, or you can specify that IP values should be set automatically for both controllers through communication with a Dynamic Host Configuration Protocol (DHCP) server.

Each controller has the following factory-default IP settings:

- DHCP: disabled
- Controller A IP address: 10.0.0.2
- Controller B IP address: 10.0.0.3
- IP subnet mask: 255.255.255.0
- Gateway IP address: 10.0.0.1

When DHCP is enabled, the following initial values are set and remain set until the system is able to contact a DHCP server for new addresses.

- Controller IP addresses: 169.254.x.x (where the value of x . x is the lowest 16 bits of the controller serial number)
- IP subnet mask: 255.255.0.0
- Gateway IP address: 0.0.0.0

169.254.x . x addresses (including gateway 169.254.0.1) are on a private subnet that is reserved for unconfigured systems and the addresses are not routable. This prevents the DHCP server from reassigning the addresses and possibly causing a conflict where two controllers have the same IP address. As soon as possible, change these IP values to proper values for your network.

To switch a controller from DHCP addressing to static addressing, you must set the IP address, netmask, and gateway values.

NOTE: The following IP addresses are reserved for internal use by the storage system: 192.168.200.253, 192.168.200.254, 172.22.255.253, 172.22.255.254, and 127.x.x.x.

Min. role manage

Syntax `set network-parameters`
`[controller a|b]`
`[dhcp]`
`[gateway gateway]`
`[ip address]`
`[ipv 4|6]`
`[netmask netmask]`
`[ping-broadcast enabled|disabled|on|off]`

Parameters `controller a|b`

Optional. For IP-related parameters, this specifies whether to apply settings to controller A or B. If this parameter is omitted, settings are applied to the controller being accessed. This parameter does not apply to Ethernet switch-related parameters, whose settings are always applied to the controller being accessed.

`dhcp`

Optional. Specifies to use DHCP to set both controllers' IP values.

`gateway gateway`

Optional. A gateway IP address for the port.

`ip address`

Optional. An IP address for the port.

`ipv 4|6`

Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing the network ports.

- 4: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values and the octets are separated by a period; for example, 10.132.2.205. The first octet may not be zero, with the exception that 0.0.0.0 can be used to disable the interface (stop I/O). This option is the default.
- 6: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, 0000:0000:0000:0000:0000:0000:0A90:3442.

`netmask netmask`

Optional. An IP subnet mask for the port.

`ping-broadcast enabled|disabled|on|off`

Optional. Enables the storage system to respond when a ping to a broadcast address is issued on the system's subnet. The default is Disabled.

Example Use DHCP to set network port IP values.

```
# set network-parameters dhcp
```

Manually set network port IP values for controller A (disabling DHCP for both controllers, if it was enabled) using IPv4 addressing.

```
# set network-parameters ip 192.168.0.10 netmask 255.255.255.0 gateway  
192.168.0.1 controller a
```

See also • [show network-parameters](#)

set ntp-parameters

Description Sets Network Time Protocol (NTP) parameters for the system. You can manually set system date and time parameters by using the [set controller-date](#) command. You must specify at least one of the optional parameters for the command to succeed.

Min. role manage

Syntax `set ntp-parameters`
`[ntp enabled|disabled|on|off]`
`[ntpaddress IP-address]`
`[timezone +|-hh[:mm]]`

Parameters `ntp enabled|disabled|on|off`
Optional. Enables or disables use of NTP. When NTP is enabled and the specified NTP server is available, each controller's time is synchronized with the server.

`ntpaddress IP-address`
Optional. The network address of an available NTP server.

`timezone +|-hh[:mm]`
Optional. The system's time zone as an offset in hours (-12 through +14) and optionally minutes (00–59) from Coordinated Universal Time (UTC). To specify a positive offset, the '+' is optional. To specify a negative offset, the '-' is required. The hour value can have one or two digits and can omit a leading zero. If the minutes value is specified it must have two digits. If it is omitted, the minutes value is set to 00.

Example Set the system to use NTP with an offset for the Mountain Time zone.

```
# set ntp-parameters ntp enabled ntpaddress 69.10.36.3 timezone -7
```

Set the system to use NTP with an offset for the Bangalore, India, time zone.

```
# set ntp-parameters ntp enabled ntpaddress 69.10.36.3 timezone +5:30
```

See also

- [set controller-date](#)
- [show controller-date](#)
- [show ntp-status](#)

set password

Description Sets a user's password for system interfaces (such as the CLI). A password can be entered as part of the command, or the command prompts you to enter and re-enter the new password.

Min. role manage

Syntax `set password`
 `[password password]`
 `[user]`

Parameters `password password`
Optional. Sets a new password for the user. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

If this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed obscured for security reasons. For an SNMPv3 user whose `authentication-type` parameter is set to `use authentication`, this specifies the authentication password.

`user`

Optional. The user name for which to set the password. If this parameter is omitted, this command affects the logged-in user's password.

Example Change the password for the default user, `manage`.

```
# set password manage
Enter new password: *****
Re-enter new password: *****
```

Change the password for user `JDoe`.

```
# set password JDoe password Abcd%1234
```

See also • [show users](#)

set pool

Description Sets parameters for a virtual pool.

Each virtual pool has three thresholds for page allocation as a percentage of pool capacity. You can set the low and middle thresholds. The high threshold is automatically calculated based on the available capacity of the pool minus 200 GB of reserved space.

When the low or middle threshold is exceeded, event 462 is logged with Informational severity. If the high threshold is exceeded and the pool is not overcommitted, event 462 is logged with Informational severity. If the high threshold is exceeded and the pool is overcommitted, event 462 is logged with Warning severity. When pool usage falls back below any threshold, event 463 is logged with Informational severity.

NOTE: If the pool size is small (approximately 500 GB) and/or the middle threshold is relatively high, the high threshold may not guarantee 200 GB of reserved space in the pool. The controller will not automatically adjust the low and middle thresholds in such cases.

You can also set `overcommit`, which controls whether the pool uses thin provisioning.

Min. role `manage`

Syntax `set pool`
 `[low-threshold #%]`
 `[middle-threshold #%]`
 `[overcommit enabled|disabled|on|off]`
 `pool`

Parameters `low-threshold #%`

Optional. Sets the low threshold for page allocation as a percentage of pool capacity. This value must be less than the middle-threshold value. The default low-threshold value is 25%.

`middle-threshold #%`

Optional. Sets the middle threshold for page allocation as a percentage of pool capacity. This value must be between the low-threshold value and the high-threshold value. The default middle-threshold value is 50%.

`overcommit enabled|disabled|on|off`

Optional.

- `enabled` or `on`: The pool will use thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool. When stored data approaches the limit of physical capacity, the administrator can add more enclosures to the system. This is the default.
- `disabled` or `off`: The pool will use full provisioning, which means that the capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.

NOTE: If you try to disable `overcommit` and the total space allocated to thin-provisioned volumes exceeds the physical capacity of their pool, an error will say that there is insufficient free disk space to complete the operation and `overcommit` will remain enabled.

`pool`

The name of the storage pool for which to change settings.

Example For pool A, set the low threshold to 30%.

```
# set pool low-threshold 30% A
```

For pool B, disable `overcommit`.

```
# set pool overcommit off B
```

- See also
- [delete pools](#)
 - [show pools](#)

set priorities

Description Sets snapshot-retention priorities for a specified snap pool. This command applies to linear storage only.

Snap-pool priorities, in conjunction with snapshot priorities, determine which snapshots are retained if system resource limitations require some snapshots to be automatically deleted.

Lower-priority snapshots will be deleted before higher-priority snapshots. Priority values are 0x0001–0xffff (1–65535). You can enter either decimal or hexadecimal values. To use a default priority, specify the value 0.

Set a unique retention priority for each type of snapshot.

Min. role manage

Syntax `set priorities`
 `[common-sync-point #]`
 `[only-sync-point #]`
 `[queued #]`
 `[replicating #]`
 `[replication-snap #]`
 `[standard-snap #]`
 `[volume-copy #]`
 `snap-pool`

Parameters `common-sync-point #`

Optional. The retention priority for the latest snapshot that is copy complete on all secondary volumes. It identifies a common point in time that is known by all destinations. The default is 0x8000 (32768).

`only-sync-point #`

Optional. The retention priority for the only sync point that is available on at least one secondary volume. If this snapshot is removed, then the next replication requires a full sync to be performed. The default is 0xe000 (57344).

`queued #`

Optional. The retention priority for a snapshot that was taken for remote replication but is queued waiting for the previous replications to complete. The default is 0x2000 (8192).

`replicating #`

Optional. The retention priority for a snapshot that is being replicated to a secondary volume. This snapshot is required in order to resume the replication. The attribute is temporary for the duration of the replication process. The default is 0xc000 (49152).

`replication-snap #`

Optional. The retention priority for a replication snapshot. The default is 0x4000 (16384).

`standard-snap #`

Optional. The retention priority for a standard snapshot. The default is 0x6000 (24576).

`volume-copy #`

Optional. The retention priority for a snapshot that is being used to copy data from a source volume to a destination volume. This attribute is temporary for the duration of the volume-copy process. The default is 0xa000 (40960).

`snap-pool`

The name or serial number of the snap pool.

Example Set attribute priorities for snap pool SP1, raising the priority for standard snapshots and leaving other priorities unchanged.

```
# set priorities only-sync-point 65535 SP1
```

See also

- [show priorities](#)
- [show snap-pools](#)

set prompt

Description Sets the prompt for the current CLI session. This setting does not persist beyond the current session.

Min. role manage

Syntax `set prompt`
`prompt`

Parameters `prompt`

The new prompt. Input rules:

- The value is case sensitive.
- The value can have a maximum of 16 characters.
- The value can include printable UTF-8 characters except: " < \
- A value that includes a space must be enclosed in double quotes.

Example Change the prompt from "# " to "CLI\$ " and start entering a show command.

```
# set prompt "CLI$ "
```

```
Success: Command completed successfully. (2014-07-17 16:44:25)
```

```
CLI$ show ...
```

set protocols

Description Enables or disables management services and protocols. In console format, if you enable an unsecured protocol the command will prompt for confirmation.

Min. role manage

Syntax `set protocols`
[activity enabled|disabled|on|off]
[debug enabled|disabled|on|off]
[ftp enabled|disabled|on|off]
[http enabled|disabled|on|off]
[https enabled|disabled|on|off]
[management-mode v2|v3]
[ses enabled|disabled|on|off]
[smis enabled|disabled|on|off]
[snmp enabled|disabled|on|off]
[ssh enabled|disabled|on|off]
[telnet enabled|disabled|on|off]
[usmis enabled|disabled|on|off]

Parameters `activity enabled|disabled|on|off`
Optional. Enables or disables access to the activity progress interface via HTTP port 8081. This mechanism reports whether a firmware update or partner firmware update operation is active and shows the progress through each step of the operation. In addition, when the update operation completes, status is presented indicating either the successful completion, or an error indication if the operation failed. This is disabled by default.

`debug enabled|disabled|on|off`
Optional. Enables or disables debug capabilities, including Telnet debug ports and privileged diagnostic user IDs. This is disabled by default.

`ftp enabled|disabled|on|off`
Optional. Enables or disables the expert interface for updating firmware. This is enabled by default.

`http enabled|disabled|on|off`
Optional. Enables or disables the standard WBI web server. This is disabled by default.

`https enabled|disabled|on|off`
Optional. Enables or disables the secure WBI web server. This is enabled by default.

`management-mode v2|v3`
Optional. Sets the default management mode for the system.

- `v2`: Specifies to use the legacy WBI interface to manage linear storage, and to use terminology in CLI output and system messages that is oriented to managing a linear system, such as *vdisk* for disk groups and pools. This is the default for a system that has been upgraded from a previous release.
- `v3`: Specifies to use the new WBI interface to manage virtual and linear storage, and to use terminology in CLI output and system messages that is oriented to managing a hybrid (linear and virtual) system, such as *disk group* for disk groups and *pool* for pools. This is the default for a new installation.

To change the management mode for the current CLI session only, use the `set cli-parameters` command.

`ses enabled|disabled|on|off`
Optional. Enables or disables the in-band SCSI Enclosure Management Services interface. This is enabled by default.

`smis enabled|disabled|on|off`
Optional. Enables or disables the secure Storage Management Initiative Specification interface (SMI-S) interface. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTPS port 5989. HTTPS port 5989 and HTTP port 5988 cannot be enabled at the same time, so enabling this option will disable port 5988. This is enabled by default.

`snmp enabled|disabled|on|off`

Optional. Enables or disables the Simple Network Management Protocol interface. Disabling this option disables all SNMP requests to the MIB and disables SNMP traps. To configure SNMP traps use the [set snmp-parameters](#) command. This is enabled by default.

`ssh enabled|disabled|on|off`

Optional. Enables or disables the secure shell CLI. This is enabled by default.

`telnet enabled|disabled|on|off`

Optional. Enables or disables the standard CLI. This is enabled by default.

`usmis enabled|disabled|on|off`

Optional. Enables or disables the unsecure Storage Management Initiative Specification (SMI-S) interface. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988. HTTP port 5988 and HTTPS port 5989 cannot be enabled at the same time, so enabling this option will disable port 5989. This is disabled by default.

Example Disable unsecure HTTP connections and enable FTP.

```
# set protocols http disabled ftp enabled
```

Enable Telnet, which is an unsecured protocol.

```
# set protocols telnet enabled
```

Enabling the Telnet protocol may result in unsecured management operations being sent across the network. Do you want to continue? **yes**

Set the default management mode to v3.

```
# set protocols management-mode v3
```

See also

- [set cli-parameters](#)
- [show protocols](#)

set remote-system

Description Changes remote-system credentials stored in the local system. This command applies to linear storage only.

Do this when the user name or password to access a remote system has been changed in that system.

Min. role manage

Syntax `set remote-system`
 `[password password]`
 `[username username]`
 `system`

Parameters `password password`
Optional. The new password to access the remote system. The value is displayed in clear text.

`username username`
Optional. The new user name to access the remote system.

`system`
The name or network-port IP address of the remote system.

Example Change the password that is stored to access a remote system.

```
# set remote-system password Abc_123 System2
```

See also

- [create remote-system](#)
- [delete remote-system](#)
- [remote](#)
- [show remote-systems](#)

set replication-primary-volume

Description Changes the primary volume for a replication set. This command applies to linear storage only.

You must issue this command to each volume in the replication set. If the volumes in a replication set have different primary-volume settings — for example, if the primary volume was changed while one volume was offline — this results in a primary-volume conflict. Change the primary volume on the secondary system, then, if possible, change the primary volume on the primary system.

As part of this command, you can initiate a rollback to a specified snapshot to synchronize the new primary volume with a known data image.

When the secondary volume becomes the primary volume, it only retains the replication images that the primary volume had and deletes any images that the primary volume did not have. Because the secondary volume may not have successfully replicated all the images associated with the primary volume, the secondary volume might have a subset of the primary volume's images.

Min. role manage

Syntax `set replication-primary-volume`
`[nowait]`
`primary-volume replication-volume`
`[set replication-set]`
`[snapshot snapshot]`
`volume replication-volume`

Parameters `nowait`

Optional. Changing the primary volume can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands.

`primary-volume replication-volume`

The name or serial number of the replication volume to designate as the new primary volume for the replication set. If the name is not unique, you must specify the serial number.

`set replication-set`

Optional. The name or serial number of the replication set.

`snapshot snapshot`

Optional. The name or serial number of a snapshot to roll the replication volume data back to.

`volume replication-volume`

The name or serial number of a volume in the replication set whose primary volume you want to change. If one of the volumes in the replication set is offline, this must specify the volume that remains online. If the name is not unique across replication sets, specify the `set` parameter.

Example For this example, assume that:

- Replication set RS has the primary volume Data and the secondary volume rData.
- Primary volume Data resides in the primary system, System1.
- Secondary volume rData resides in the secondary system, System2.

On System1, view the status of replication set RS.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
  Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
  Data ... Online ... Local    Data          ... Online
  rData ... Online ... Remote  Data          ... Online
```

On System1, unmap the primary volume from hosts.

On System2, set secondary volume rData to be the primary volume.

```
# set replication-primary-volume volume rData primary-volume rData
Info: Started setting the primary volume of the replication set. (RS)
Info: Setting the primary volume of the replication set. This may take a
couple of minutes... (RS)
Info: Successfully set primary volume: (rData)
Info: The primary volume of the replication set was changed. (RS)
Success: Command completed successfully. (2012-13-23 11:48:30)
```

On System2, view the set's status and notice that the primary volume has changed and that a primary-volume conflict exists.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Remote Data ... Conflict
rData ... Online ... Local rData ... Conflict
```

On System1, view the set's status and notice that it does not reflect the primary-volume change, thereby causing the conflict.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local Data ... Conflict
rData ... Online ... Remote Data ... Conflict
```

On System1, as already done on System2, set rData to be the primary volume.

```
# set replication-primary-volume volume Data primary-volume rData
Info: Started setting the primary volume of the replication set. (RS)
Info: Setting the primary volume of the replication set. This may take a
couple of minutes... (RS)
Info: Successfully set primary volume: (rData)
Info: The primary volume of the replication set was changed. (RS)
Success: Command completed successfully. (2012-13-23 11:55:50)
```

On System1 (the new secondary system), view the set's status and notice that the system is set to use the new primary volume and the conflict is resolved.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local rData ... Online
rData ... Online ... Remote rData ... Online
```

Wait a couple of minutes for processing to complete. Then, on System2 (the new primary system), view the set's status and notice that the system is set to use the new primary volume and that the conflict is resolved:

```
# show replication-sets
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local rData ... Online
rData ... Online ... Remote rData ... Online
```

Map the new primary volume to hosts.

- See also
- [show replication-sets](#)
 - [show replication-volumes](#)
 - [show snapshots](#)
 - [unmap volume](#)

set replication-volume-parameters

Description Sets parameters for a specified replication volume. This command applies to linear storage only. This command must be run separately on each system where the volume resides; changes to these parameters are not automatically synchronized across systems.

Min. role manage

Syntax `set replication-volume-parameters`
`[link-type FC|iSCSI]`
`[max-queue #]`
`[max-retry-time #]`
`[monitor-interval #]`
`[on-collision newest|oldest]`
`[on-error retry|suspend]`
`[priority low|medium|high]`
`[remote-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs]`
`[set replication-set]`
`replication-volume`

Parameters `link-type FC|iSCSI`
Optional. Specifies the type of ports being used for the inter-system link:

- `FC`: FC ports.
- `iSCSI`: iSCSI ports.

`max-queue #`

Optional. The number of replication images to consider when determining the next image to replicate: 1–64. Used only if the `on-collision` parameter is set to `oldest`.

`max-retry-time #`

Optional; valid only if the `on-error` parameter is set to `retry`. Maximum time in seconds to retry a single replication if an error occurs. Allowed values are 0–64000. A value of 0 means do not time out retries (retry forever). By default, a retry will occur 5 minutes after an error occurs. If another error occurs and the difference in time between when the error occurs and the initial retry time is greater than the `max-retry-time` value, the replication will be suspended. In order to prevent a replication set from suspending when multiple independent, discontinuous errors occur during a single replication, set `max-retry-time` for the secondary volume either to 0 (retry forever) or to 60 minutes for each 10GB of volume size. The default is 1800 (30 minutes).

`monitor-interval #`

Optional. The interval in seconds at which the primary volume should query the secondary volume. Values less than 300 (5 minutes) or greater than 1800 (30 minutes) are not recommended.

`on-collision newest|oldest`

Optional. The collision policy to use when the image queue depth is met:

- `newest`: Only the latest replication image should be considered for the next replication operation.
- `oldest`: Only the latest *N* replication images should be considered for the next replication operation, where *N* is defined by the `max-queue` parameter and the oldest of these images should be considered first.

`on-error retry|suspend`

Optional. The error policy to use when errors occur during the replication process:

- `retry`: Retry the operation for the time specified in the `max-retry-time` parameter.
- `suspend`: Suspend the replication operation.

`priority low|medium|high`

Optional. The priority of the replication process for the replication volume: low, medium, or high.

`remote-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs`

Optional. The host port addresses associated with a replication volume. For the secondary system on which the command is run, you can specify host ports by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, `10.134.11.10:3260`. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the replication volume. If the name is not unique within the replication set, the local volume is assumed. If the name is not unique across replication sets, specify the set parameter. A name that includes a space must be enclosed in double quotes.

Example Set a new remote address and error policy for replication volume MV2 in replication set RS1.

```
# set replication-volume-parameters remote-address ip=10.1.66.55 on-error
suspend set RS1 MV2
```

Assume you changed the addresses of host ports in secondary system `Site2`, which contains secondary volume `rData`. To update this address information for the replication set, run `set replication-volume-parameters` on the secondary system, specifying the secondary system's new addresses and the name of the secondary volume.

```
# set replication-volume-parameters remote-address
ip=10.20.5.27,10.30.5.27,10.20.5.37,10.30.5.37 rData
```

See also

- [show replication-sets](#)
- [show replication-volumes](#)

set schedule

Description Changes parameters for a specified schedule. If you want to change the schedule name, create a new schedule to replace the existing one. You must specify at least one of the optional parameters for the command to succeed.

When scheduling `ReplicateVolume` tasks, a best practice is to schedule no more than three volumes to start replicating at the same time, and for those replications to recur no less than 60 minutes apart. If you schedule more replications to start at the same time, or schedule replications to start more frequently, some scheduled replications may not have time to complete.

Min. role `manage`

Syntax `set schedule`
 `[schedule-specification "specification"]`
 `[task-name task-name]`
 `schedule-name`

Parameters `schedule-specification "specification"`

Optional. Defines when the task will first run, and optionally when it will recur and expire. You can use a comma to separate optional conditions. Dates cannot be in the past. For times, if neither AM nor PM is specified, a 24-hour clock is used.

- `start yyyy-mm-dd hh:mm [AM|PM]`
Specifies a date and a time in the future to be the first instance when the scheduled task will run, and to be the starting point for any specified recurrence.
- `[every # minutes|hours|days|weeks|months|years]`
Specifies the interval at which the task will run.
For better performance when scheduling a `TakeSnapshot` task that will run under heavy I/O conditions or on more than three volumes, the retention count and the schedule interval should be set to similar values. For example if the retention count is 10, then the interval should be set to 10 minutes. For a `ReplicateVolume` task, the minimum interval is 30 minutes.
- `[between hh:mm [AM|PM] and hh:mm [AM|PM]]`
Constrains the time range during which the task is permitted to run. Ensure that the start time is within the specified time range.
- `[only any|first|second|third|fourth|fifth|last|#st|#nd|#rd|#th
weekday|weekendday|Sunday|Monday|Tuesday|Wednesday|Thursday|Friday
|Saturday of year|month|January|February|March|April|May|June|July |
August|September|October |November|December]`
Constrains the days or months when the task is permitted to run. Ensure that this constraint includes the start date.
- `[count #]`
Constrains the number of times the task is permitted to run.
- `[expires yyyy-mm-dd hh:mm [AM|PM]]`
Specifies when the schedule expires, after which the task will no longer run.

NOTE: If tasks are scheduled close together, the end of one task may overlap the next task. If this happens, a task may not complete.

`task-name task-name`

Optional. The name of an existing task to run. A name that includes a space must be enclosed in double quotes.

`schedule-name`

The name of the schedule to change. A name that includes a space must be enclosed in double quotes.

Example Change parameters, including the associated task, for schedule Sched1.

```
# set schedule schedule-specification "start 2015-01-01 00:01 every 1 days
expires 2015-12-31 00:01" task-name Task1 Sched1
```

See also

- [show schedules](#)
- [show tasks](#)

set snap-pool-policy

Description Sets the recovery policy that determines the action taken when a specified snap pool's error and critical threshold levels are reached. This command applies to linear storage only.

The policy for the warning threshold is preset to `notifyonly`.

NOTE: The policies `deleteoldestsnapshot` and `deletesnapshots` do not apply business logic to the delete decision and may delete snapshots that are mounted/presented/mapped or modified. You may set retention priorities for a snap pool as a way of suggesting that some snapshots are more important than others, but these priorities do not ensure any specific snapshot is protected.

Min. role `manage`

Syntax `set snap-pool-policy`
`[autoexpansionsize size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]`
`[critical deleteoldestsnapshot|deletesnapshots|haltwrites]`
`[error autoexpand|deleteoldestsnapshot|deletesnapshots|haltwrites`
`|notifyonly]`
`snap-pool`

Parameters `autoexpansionsize size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
The amount by which the snap pool will be automatically expanded when the threshold level is reached. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

`critical deleteoldestsnapshot|deletesnapshots|haltwrites`
Optional. Specifies the policy to invoke when the critical threshold level of snap-pool usage is reached.

`error autoexpand|deleteoldestsnapshot|deletesnapshots|haltwrites`
`|notifyonly`
Optional. The policy to invoke when the error threshold level of snap-pool usage is reached.

- `autoexpand`: Automatically expand the snap pool using the `autoexpansionsize` value. If the snap pool's space usage reaches the percentage specified by its error threshold, the system will log Warning event 230 and will try to automatically expand the snap pool by the snap pool's `autoexpansionsize` value (below).
 - If the snap pool is successfully expanded, the system will log Informational event 444.
 - If the snap pool cannot be expanded because there is not enough available space in its vdisk, the system will log Warning event 444 and will automatically delete the oldest snapshot that is not a current sync point.

Each time the snap-pool's error threshold is reached and the system cannot auto-expand the vdisk, the oldest remaining snapshot (that is not a current sync point) will be deleted. This behavior occurs for each snap pool independently, based on its space usage.

- `deleteoldestsnapshot`: Delete the oldest snapshot.
- `deletesnapshots`: Delete all snapshots.
- `haltwrites`: Halt writes to all master volumes and snapshots associated with the snap pool.
- `notifyonly`: Generates an event to notify the administrator.

`snap-pool`

The name or serial number of the snap pool for which to set the policy. A name that includes a space must be enclosed in double quotes.

Example Set snap pool `SP1` to automatically expand by 10 GB when its error threshold is reached.

```
# set snap-pool-policy error autoexpand autoexpansionsize 10GB SP1
```


- See also
- [set priorities](#)
 - [set snap-pool-threshold](#)
 - [show snap-pools](#)

set snap-pool-threshold

Description Sets the percentages of snap-pool space used that trigger the warning and error threshold policies. This command applies to linear storage only.

Three thresholds are defined:

- **Warning:** The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator.
- **Error:** The snap pool is nearly full and unless corrective action is taken, snapshot data loss is probable. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.
- **Critical:** The snap pool is 98% full and data loss is imminent. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.

The recommended minimum size for a snap pool is 50 GB.

Min. role manage

Syntax `set snap-pool-threshold`
 `[error #%]`
 `[warning #%]`
 `snap-pool`

Parameters `error #%`

The percent of snap-pool space used that triggers the error threshold policy. This value must be less than 98%. The default is 90%.

`warning #%`

The percent of snap-pool space used that triggers the warning threshold policy. This value must be less than the error threshold value. The default is 75%.

`snap-pool`

The name or serial number of the snap pool for which to set the threshold. A name that includes a space must be enclosed in double quotes.

Example Set the warning and error thresholds for snap pool SP1.

```
# set snap-pool-threshold warning 60% error 85% SP1
```

See also

- [set snap-pool-policy](#)
- [show snap-pools](#)

set snmp-parameters

Description Sets SNMP parameters for event notification. To enable or disable SNMP requests to the MIB use the [set protocols](#) command.

Min. role manage

Syntax `set snmp-parameters`
`[add-trap-host address]`
`[del-trap-host address]`
`[enable crit|error|warn|info|none]`
`[read-community string]`
`[trap-host-list trap-host-list]`
`[write-community string]`

Parameters `add-trap-host address`
Optional. Specifies the IP address of a destination host that will receive traps. Three trap hosts can be set.

`del-trap-host address`
Optional. Deletes a trap destination host.

`enable crit|error|warn|info|none`
Optional. Sets the level of trap notification:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: All events are excluded from trap notification and traps are disabled.

`read-community string`
Optional. Sets a community string for read-only access. Input rules:

- The value is case sensitive.
- The value can have a maximum of 31 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include any character except: " < >
- A value that includes a space must be enclosed in double quotes.

`trap-host-list trap-hosts`
Optional. Replaces the current list.

`write-community string`
Optional. Sets a community string for write access. Input rules:

- The value is case sensitive.
- The value can have a maximum of 31 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include any character except: " < >
- A value that includes a space must be enclosed in double quotes.

Example Enable Critical events only, specify a trap host, and set the community string for read-only access.

```
# set snmp-parameters enable crit add-trap-host 172.22.4.171 read-community public
```

- See also**
- [set protocols](#)
 - [show snmp-parameters](#)
 - [test](#) (with the `snmp` parameter)

set spares (Deprecated)

Use [add spares](#) or [remove spares](#).

set syslog-parameters

Description Sets remote syslog notification parameters for events and managed logs. This allows events to be logged by the syslog of a specified host computer. Syslog is a protocol for sending event messages across an IP network to a logging server.

Min. role manage

Syntax `set syslog-parameters`
 `[host-ip IP-address]`
 `[host-port port-number]`
 `notification-level crit|error|warn|info|none`

Parameters `host-ip IP-address`
Optional. An IP address for the host. If `notification-level` is other than `none`, `host-ip` must be specified.

`host-port port-number`
Optional. A specific port number on the host.

`notification-level crit|error|warn|info|none`
The minimum severity for which the system should send notifications:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables syslog notification.

If `notification-level` is other than `none`, `host-ip` must be specified.

Example Set the system to send an entry to the remote server at 10.1.1.10 on port 514 when a critical event occurs.

```
# set syslog-parameters notification-level crit host-ip 10.1.1.10 host-port 514
```

See also

- [show syslog-parameters](#)
- [test](#)

set system

Description Sets the system's name, contact person, location, and description. The name, location, and contact are included in event messages. All four values are included in system debug logs for reference by service personnel. When using the WBI, the system name appears in the browser title bar or tab.

Input rules for each value:

- The value is case sensitive.
- The value can have a maximum of 79 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " < > \
- A value that includes a space must be enclosed in double quotes.

Min. role manage

Syntax `set system`
 `[contact value]`
 `[info value]`
 `[location value]`
 `[name value]`

Parameters `contact value`
Optional. The name of the person who administers the system.

`info value`
Optional. A brief description of what the system is used for or how it is configured.

`location value`
Optional. The location of the system.

`name value`
Optional. A name to identify the system.

Example Set the system name to `Test` and the contact to `J. Doe`.

```
# set system name Test contact "J. Doe"
```

See also • [show system](#)

set task

Description Changes parameters for a TakeSnapshot, ReplicateVolume, or VolumeCopy task. For these types of tasks, you can change parameters other than name, type, or associated volumes. If you change the parameters for a running task, the changes will take effect the next time the task runs.

If you want to change parameters for a ResetSnapshot task or the name, type, or associated volumes for another type of task, create a new task to replace the existing one.

Min. role manage

Syntax `set task`
`[dest-prefix prefix]`
`[dest-vdisk vdisk]`
`[modified-snapshot yes|no]`
`[replication-mode new-snapshot|last-snapshot]`
`[retention-count #]`
`[snapshot-prefix prefix]`
`name`

Parameters `dest-prefix prefix`

Optional. A label to identify the volume copy created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 26 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`dest-vdisk vdisk`

Optional. The name or serial number of the destination vdisk for the volume copy. A name that includes a space must be enclosed in double quotes.

`modified-snapshot yes|no`

Optional. For a VolumeCopy task, specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot.

- `yes`: Include modified snapshot data.
- `no`: Exclude modified snapshot data.

If this parameter is omitted for a snapshot, modified snapshot data is excluded.

`replication-mode new-snapshot|last-snapshot`

Optional. Specifies whether to replicate a new snapshot of the volume to the remote system, or to replicate the last (most recent existing) snapshot of the volume to the remote system.

- `new-snapshot`: Replicate a new snapshot.
- `last-snapshot`: Replicate the most recent existing snapshot.

If this parameter is omitted, a new snapshot is replicated.

`retention-count #`

Optional. For a TakeSnapshot task this parameter specifies the number of snapshots created by this task to retain, from 1 to the licensed limit. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted. If you reduce the retention count for a task, excess snapshots will be removed the next time the task runs.

For a ReplicateVolume task this parameter specifies the number of replication images created by this task to retain, from 2 to 32. When a new image exceeds this limit, the oldest image with the same prefix is deleted. This parameter applies to the primary volume only. For the secondary volume, images will accumulate until either the secondary vdisk's space limit is reached or the maximum number of images is reached, after which the oldest image will be deleted as new images are created.

`snapshot-prefix` *prefix*

Optional. A label to identify snapshots created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 26 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

name

The name of the task to change. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Change parameters for a TakeSnapshot-type task named Snap.

```
# set task snapshot-prefix VD1v1 retention-count 2 Snap
```

Change parameters for a VolumeCopy-type task named Copy.

```
# set task dest-vdisk VD3 dest-prefix VD1v1 modified-snapshot no Copy
```

Change parameters for a ReplicateVolume-type task named Replicate:

```
# set task snapshot-prefix VD1v2 replication-mode last-snapshot Replicate
```

- See also
- [create task](#)
 - [delete task](#)
 - [set schedule](#)
 - [show schedules](#)
 - [show tasks](#)

set user

Description Changes user preferences for the session or permanently. The system requires at least one CLI user with the `manage` role to exist.

A user with the `manage` role can change any parameter except `name`. A user with the `monitor` role can change any parameter for that user except `name`, `roles`, and `interfaces`.

NOTE: User changes take effect when the user next logs in.

Min. role `monitor`

Syntax `set user`

```
[authentication-type MD5|SHA|none]
[base 2|10]
[interfaces interfaces]
[locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja
|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t]
[password password]
[precision #]
[privacy-password encryption-password]
[privacy-type DES|AES|none]
[roles roles]
[session-preferences]
[storage-size-base 2|10]
[storage-size-precision #]
[storage-size-units auto|MB|GB|TB]
[temperature-scale celsius|c|fahrenheit|f]
[timeout #]
[trap-host IP-address]
[type novice|standard|advanced|diagnostic]
[units auto|MB|GB|TB]
name
```

Parameters `authentication-type MD5|SHA|none`
Optional. For an SNMPv3 user, this specifies whether to use a security authentication protocol. This parameter requires the `password` parameter and, for the `snmptarget` interface, the `trap-host` parameter.

- `MD5`: MD5 authentication. This is the default.
- `SHA`: SHA (Secure Hash Algorithm) authentication.
- `none`: No authentication.

`base 2|10`

Optional. Sets the base for entry and display of storage-space sizes:

- `2`: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. In base 2 when you set a size, whether you specify a base-2 or base-10 size unit, the resulting size will be in base 2.
- `10`: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. In base 10 when you set a size, the resulting size will be in the specified unit. This option is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

`interfaces interfaces`

Optional. Specifies the interfaces that the user can access. Multiple values must be separated by commas and no spaces. A command that specifies `snmpuser` or `snmptarget` cannot also specify a non-SNMP interface.

- `cli`: Command-line interface. This is enabled by default.
- `wbi`: Web-browser interface. This is enabled by default.
- `ftp`: FTP interface.
- `smis`: Storage Management Initiative Specification (SMI-S) interface.
- `snmpuser`: Allows an SNMPv3 user to view the SNMP MIB.
- `snmptarget`: Allows an SNMPv3 user to receive SNMP trap notifications. This option requires the `trap-host` parameter.
- `none`: No interfaces.

`locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t`
Optional. The display language.

`password password`

Optional in console format; required for XML API format. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.
- For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password.

`precision #`

Optional. Sets the number of decimal places (1–10) for display of storage-space sizes. The default is 1.

`privacy-password encryption-password`

Optional. For an SNMPv3 user whose `privacy-type` parameter is set to use encryption, this specifies the encryption password. The value is case sensitive and must contain 8–32 characters. A password cannot contain the following characters: angle brackets, backslash, comma, double quote, single quote, or space. If the password contains only printable ASCII characters then it must contain at least one uppercase character, one lowercase character, and one non-alphabetic character. .

`privacy-type DES|AES|none`

Optional. For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the `privacy-password` parameter and the `authentication-type` parameter.

- `DES`: Data Encryption Standard.
- `AES`: Advanced Encryption Standard.
- `none`: No encryption. This is the default.

`roles roles`

Optional. Specifies the user's roles as one or more of the following values:

- `monitor`: User can view but not change system settings. This is the default.
- `manage`: User can view and change system settings.
- `diagnostic`: User can view and change system settings.

Multiple values must be separated with a comma (with no spaces). If multiple values are specified, the user's access to commands will be determined by the highest role specified.

`session-preferences`

Optional. Specifies that the current CLI settings will become permanent settings for the user. This parameter cannot be combined with any other parameter.

`storage-size-base 2|10`

Optional. Alias for `base`.

`storage-size-precision #`

Optional. Alias for `precision`.

`storage-size-units auto|MB|GB|TB`

Optional. Alias for `units`.

`temperature-scale celsius|c|fahrenheit|f`

Optional. Sets the scale for display of temperature values:

- `fahrenheit` or `f`: Temperatures are shown in degrees Fahrenheit.
- `celsius` or `c`: Temperatures are shown in degrees Celsius. This is the default.

`timeout #`

Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

`trap-host IP-address`

Optional. For an SNMPv3 user whose `interface` parameter is set to `snmptarget`, this specifies the IP address of the host that will receive SNMP traps.

`type novice|standard|advanced|diagnostic`

Optional. Identifies the user's experience level. This parameter is informational only and does not affect access to commands. The default is `standard`.

`units auto|MB|GB|TB`

Optional. Sets the unit for display of storage-space sizes:

- `auto`: Sizes are shown in units determined by the system. This is the default.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

Based on the `precision` setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `units` is set to `TB`, `precision` is set to `1`, and `base` is set to `10`, the size `0.11709 TB` is instead shown as `117.1 GB`.

`name`

Specifies the user account to change. A name that includes a space must be enclosed in double quotes.

Example Change the temperature scale and accessible interfaces for user `jsmith`.

```
# set user jsmith temperature-scale f interfaces wbi,cli
```

Change the password for user `JDoe`.

```
# set user JDoe password Abcd%1234
```

Change the authentication type for SNMPv3 user `Traps`.

```
# set user Traps authentication-type MD5 password Snmp%Trap
```

- See also
- [set password](#)
 - [show users](#)

set vdisk

Description Changes parameters for a specified vdisk. This command applies to linear storage only.


Min. role manage

Syntax `set vdisk`
 `[name new-name]`
 `[owner a|b]`
 `[spin-down-delay delay]`
 `vdisk`

Parameters `name new-name`
Optional. A new name for the vdisk. A name that includes a space must be enclosed in double quotes.

`owner a|b`
Optional. The new owner: controller A or B.

△ **CAUTION:** Before changing the owning controller for a vdisk, you must stop host I/O to the vdisk's volumes. Volume mappings are not affected.

 **IMPORTANT:** Changing ownership of a vdisk while any volumes in the vdisk are mapped to live hosts is not supported and may cause data loss or unavailability. All volumes in the vdisk must be unmapped or attached hosts must be shut down before the ownership of a vdisk is changed.

`spin-down-delay delay`

Optional. Sets the period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1 to 360 minutes. Setting the delay to 1–360 minutes will enable spin down. Setting the delay to 0 will disable spin down.

Drive spin down affects disk operations as follows:

- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

NOTE: Drive spin down is not applicable to disks in virtual pools.

`vdisk`

The name or serial number of the vdisk to change. A name that includes a space must be enclosed in double quotes.

Example Rename vdisk VD1 to VD2 and set its spin-down delay to 10 minutes.

```
# set vdisk name VD2 spin-down-delay 10 VD1
```

See also • [show vdisks](#)

set vdisk-spare (Deprecated)

Use [add spares](#).

set volume

Description Changes parameters for a volume.

Syntax `set volume`
 `[access read-write|rw|read-only|ro]`
 `[identifying-information description]`
 `[name new-name]`
 `volume`

Parameters `access read-write|rw|read-only|ro`
Deprecated—to change mapping settings, use the [map volume](#) command.

`identifying-information description`

Optional. A description of the volume to help a host-side user identify it. Input rules:

The value is case sensitive.

- The value can have a maximum of 127 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`name new-name`

Optional. A new name for the volume. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`volume`

The name or serial number of the volume to change. A name that includes a space must be enclosed in double quotes.

Example Rename volume V1 to V2.

```
# set volume name V2 V1
```

Set identifying information for V3.

```
# set volume identifying-information "Project X data" V3
```

See also

- [show maps](#)
- [show volumes](#)

set volume-group

Description Sets the name of a volume group.

Min. role manage

Syntax `set volume-group
name new-name
volume-group`

Parameters name *new-name*

A new name for the volume group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes

volume-group

The current name of the volume group. A value that includes a space must be enclosed in double quotes.

Example Change the name of VGroup1 to MyVGroup.

```
# set volume-group name MyVGroup VGroup1
```

See also • [show volume-groups](#)

show advanced-settings

Description Shows the settings for advanced system-configuration parameters.

Min. role monitor

Syntax show advanced-settings

Output Disk Group Background Scrub (v3)

Shows whether disks in disk groups are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the Disk Group Background Scrub Interval field.

- **Disabled:** Background disk-group scrub is disabled. This is the default.
- **Enabled:** Background disk-group scrub is enabled.

Vdisk Background Scrub (v2)

Shows whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the Vdisk Background Scrub Interval field.

- **Disabled:** Background vdisk scrub is disabled. This is the default.
- **Enabled:** Background vdisk scrub is enabled.

Disk Group Background Scrub Interval (v3)

Shows the interval between background disk-group scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.

Vdisk Background Scrub Interval (v2)

Shows the interval between background vdisk scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.

Partner Firmware Upgrade

Shows whether component firmware versions are monitored and will be automatically updated on the partner controller.

- **Disabled:** Partner firmware upgrade is disabled.
- **Enabled:** Partner firmware upgrade is enabled. This is the default.

Utility Priority

Priority at which data-redundancy utilities, such as vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk background scrub, which always runs at "background" priority.)

- **High:** Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.
- **Medium:** Utility performance is balanced with host I/O performance.
- **Low:** Utilities run at a slower rate with minimal effect on host I/O.

SMART

Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.

- **Detect-Only:** Each disk in the system retains its individual SMART setting, as will new disks added to the system.
- **Enabled:** SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.
- **Disabled:** SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

Dynamic Spare Configuration

Shows whether the storage system will automatically use a compatible disk as a spare to replace a failed disk in a vdisk if no compatible spare is available.

- **Disabled:** The dynamic spares feature is disabled. This is the default.
- **Enabled:** The dynamic spares feature is enabled.

Enclosure Polling Rate

Shows the interval in seconds at which the storage system will poll each enclosure's Enclosure Management Processor (EMP) for status changes, from 5 to 3600 seconds. The default is 5 seconds.

Host Control of Caching

Shows whether hosts are allowed to use the SCSI `MODE SELECT` command to change the storage system's write-back cache setting.

- **Disabled:** Host control of caching is disabled. This is the default.
- **Enabled:** Host control of caching is enabled.

Sync Cache Mode

Shows how the SCSI `SYNCHRONIZE CACHE` command is handled:

- **Immediate:** Good status is returned immediately and cache content is unchanged.
- **Flush To Disk:** Good status is returned only after all write-back data for the specified volume is flushed to disk.

Independent Cache Performance Mode

Shows the cache redundancy mode for a dual-controller storage system.

- **Disabled:** Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. This is the default.
- **Enabled:** The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.

Missing LUN Response

Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.

- **Not Ready:** Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is sensekey = 2, code = 4, qualifier = 3. This is the default.
- **Illegal Request:** Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is sensekey = 5, code = 25h, qualifier = 0.

Controller Failure

Shows whether the cache policy will change from write-back to write-through when a controller fails.

- **Disabled:** The controller failure trigger is disabled. This is the default.
- **Enabled:** The controller failure trigger is enabled.

Supercap Failure

Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails.

- **Disabled:** The supercapacitor failure trigger is disabled.
- **Enabled:** The supercapacitor failure trigger is enabled. This is the default.

CompactFlash Failure

Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation.

- Disabled: The CompactFlash failure trigger is disabled.
- Enabled: The CompactFlash failure trigger is enabled. This is the default.

Power Supply Failure

Shows whether the cache policy will change from write-back to write-through when a power supply fails.

- Disabled: The power-supply failure trigger is disabled. This is the default.
- Enabled: The power-supply failure trigger is enabled.

Fan Failure

Shows whether the cache policy will change from write-back to write-through when a fan fails.

- Disabled: The fan failure trigger is disabled. This is the default.
- Enabled: The fan failure trigger is enabled.

Temperature Exceeded

Shows whether the system will shut down a controller when its temperature exceeds the critical operating range.

- Disabled: The over-temperature failure trigger is disabled. This is the default.
- Enabled: The over-temperature failure trigger is enabled.

Partner Notify

Shows whether the partner controller will be notified when a trigger condition occurs.

- Disabled: Notification is disabled. The partner controller will continue using its current caching mode. This is the default.
- Enabled: Notification is enabled. The partner controller will change to write-through mode for better data protection.

Auto Write Back

Shows whether the cache mode will change from write-through to write-back when the trigger condition is cleared.

- Disabled: Auto-write-back is disabled.
- Enabled: Auto-write-back is enabled. This is the default.

Inactive Drive Spin Down

Shows whether available disks and global spares will spin down after a period of inactivity shown by the Inactive Drive Spin Down Delay field.

- Disabled: Drive spin down for available disks and global spares is disabled. This is the default.
- Enabled: Drive spin down for available disks and global spares is enabled.

Inactive Drive Spin Down Delay

Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.

Disk Background Scrub

Shows whether disks that are not in vdisks are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 72 hours.

- Disabled: Background disk scrub is disabled. This is the default.
- Enabled: Background disk scrub is enabled.

Managed Logs

Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log collection system to avoid losing diagnostic data as logs fill.

- **Disabled:** The managed logs feature is disabled. This is the default.
- **Enabled:** The managed logs feature is enabled.

Single Controller Mode

For a 2U12 or 2U24 system that had two controller modules but now has only one and is intended to be used as a single-controller system, this property shows whether the operating/redundancy mode is set to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP.

- **Enabled:** Single Controller mode is enabled.
- **Disabled:** Single Controller mode is disabled.

Auto Stall Recovery

Shows whether the auto-stall recovery feature is enabled, which detects situations where a controller stall is preventing I/O operations from completing, and recovers the system so that at least one controller is operational, thus avoiding data-unavailability situations. This feature focuses on Active-Active I/O stalls and failover/recovery stalls. When a stall is detected, event 531 is logged.

- **Disabled:** Auto-stall recovery is disabled. The system will constantly perform auto-stall detection in the background but will not automatically perform recovery actions.
- **Enabled:** Auto-stall recovery is enabled. The system will constantly perform auto-stall detection in the background and automatically perform recovery actions.

Example Show advanced system-configuration settings.

```
# show advanced-settings
```

Basetypes

- [advanced-settings-table](#)
- [status](#)

See also

- [set advanced-settings](#)

show auto-write-through-trigger (Deprecated)

Use [show advanced-settings](#).

show awt (Deprecated)

See [show auto-write-through-trigger \(Deprecated\)](#).

show cache-parameters

Description Shows cache settings and status for the system and optionally for a volume.

Min. role monitor

Syntax `show cache-parameters
[volume]`

Parameters *volume*

Optional. Name or serial number of the volume for which to show settings. A name that includes a space must be enclosed in double quotes. If this parameter is not specified, only system-wide settings are shown.

Output System cache parameters:

Operation Mode

Shows the system's operating mode, also called the cache redundancy mode:

- **Independent Cache Performance Mode:** For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- **Active-Active ULP:** Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- **Single Controller:** There is only a single controller in the enclosure.
- **Failed Over:** Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- **Down:** Both controllers are not operational.

Controller cache parameters:

Write Back Status

Shows the current, system-wide cache policy as determined by auto-write-through logic. This value is not settable by users. If an auto-write-through trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume.

- **Enabled:** Write-back. This is the normal state.
- **Disabled:** Write-through.
- **Not up:** The controller is not up.

CompactFlash Status

- **Not Installed:** The CompactFlash card is not installed.
- **Installed:** The CompactFlash card is installed.

CompactFlash Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Cache Flush

- **Enabled:** If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.
- **Disabled:** Cache flush is disabled.

Volume cache parameters:

Serial Number

If a volume is specified, its serial number.

Name

If a volume is specified, its name.

Cache Write Policy

If a volume is specified, its cache write policy:

- `write-back`: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default.
- `write-through`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

Cache Optimization

If a volume is specified, its cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

Read Ahead Size

If a volume is specified, its read-ahead cache setting:

- `Disabled`: Read-ahead is disabled.
- `Adaptive`: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.
- `Stripe`: Read-ahead is set to one stripe. The controllers treat non-RAID and RAID-1 vdisks internally as if they have a stripe size of 512 KB, even though they are not striped.
- `512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB`: Size selected by a user.

Example Show the cache parameters for the system and for volume V1.

```
# show cache-parameters V1
```

Basetypes

- [cache-settings](#)
- [cache-parameter](#)
- [status](#)

See also

- [set cache-parameters](#)
- [show volumes](#)

show certificate

Description Shows the status of the system's security certificate.

Min. role manage

Syntax show certificate
[a|b|both]

Parameters a|b|both

Optional. Specifies whether to show information for controller A, B, or both. If this parameter is omitted, information is shown for both controllers.

Output Certificate Status

- **Customer-supplied:** The controller is using a certificate that you have uploaded.
- **System-generated:** The controller is using system-generated certificates.
- **Unknown status:** The controller's certificate cannot be read. This most often occurs when a controller is restarting or the certificate replacement process is still in process.

Time Created

Date and time in the format *year-month-day hour:minutes:seconds* when the certificate was created.

Example Show certificate status for the system.

```
# show certificate
```

Basetypes • [certificate-status](#)

See also • [create certificate](#)

show channels (Deprecated)

Use [show ports](#).

show chap-records

Description For iSCSI, shows all CHAP records or the record for a specific originator. This command is permitted whether or not CHAP is enabled.

Min. role monitor

Syntax `show chap-records`
 `[name originator-name]`
 `[show-secrets]`

Parameters `name originator-name`
Optional. The originator name, typically in IQN format. If this parameter is omitted, all CHAP records are shown.

`show-secrets`

Optional. Minimum role: `manage`. Shows `Initiator Secret` and `Mutual CHAP Secret` values in command output. If this parameter is omitted, secret values are not shown.

Output `Initiator Name`
The originator name.

`Initiator Secret`

The secret that the recipient uses to authenticate the originator.

`Mutual CHAP Name`

For mutual CHAP, the recipient name.

`Mutual CHAP Secret`

For mutual CHAP, the secret that the originator uses to authenticate the recipient.

Example As a user with the `monitor` role, show the CHAP record for a specific host initiator.

```
# show chap-records name iqn.1991-05.com.microsoft:myhost.domain
```

As a user with the `manage` role, show the CHAP record for a specific host initiator.

```
# show chap-records name iqn.1991-05.com.microsoft:myhost.domain show-secrets
```

Basetypes

- [chap-records](#)
- [status](#)

See also

- [create chap-record](#)
- [delete chap-records](#)
- [set chap-record](#)
- [show iscsi-parameters](#)

show cli-parameters

Description Shows the current CLI session preferences.

Min. role monitor

Syntax show cli-parameters

Output Timeout

The time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

Output Format

- **Console:** Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. This is the default.
- **api:** Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by COMP elements.
- **api-embed:** Alternate form of XML output which displays “child” objects embedded (indented) under “parent” objects.
- **ipa:** Alternate form of XML output.
- **json:** Alternate data-interchange format.

Brief Mode

- **Enabled:** In XML output, shows a subset of attributes of object properties. The name and type attributes are always shown.
- **Disabled:** In XML output, shows all attributes of object properties. This is the default.

Base

The base for entry and display of storage-space sizes:

- **2:** Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.
- **10:** Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

Pager

- **Enabled:** Halts output after each full screen to wait for keyboard input. This is the default.
- **Disabled:** Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.

Locale

The display language. The default is English.

Precision

The number of decimal places (1–10) shown for display of storage-space sizes. The default is 1.

Units

The unit for display of storage-space sizes:

- **Auto:** Sizes are shown in units determined by the system. This is the default.
- **MB:** Sizes are shown in megabytes.
- **GB:** Sizes are shown in gigabytes.
- **TB:** Sizes are shown in terabytes.

Based on the precision setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `Units` is set to `TB`, `Precision` is set to `1`, and `Base` is set to `10`, the size `0.11709 TB` is instead shown as `117.1 GB`.

Temperature Scale

- **Fahrenheit:** Temperatures are shown in degrees Fahrenheit.
- **Celsius:** Temperatures are shown in degrees Celsius. This is the default.

Management Mode

The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session. This setting does not affect access to commands.

- **v2:** Uses terminology that is oriented to managing linear storage. For example, *vdisk* for disk groups and pools.
- **v3:** Uses terminology that is oriented to managing virtual and linear storage. For example, *disk group* for disk groups and *pool* for pools.

To see the default management mode, use the `show protocols` command.

Example Show current CLI settings.

```
# show cli-parameters
```

Basetypes

- [cli-parameters](#)
- [status](#)

See also

- [set cli-parameters](#)
- [show protocols](#)

show configuration

Description Shows system configuration information.

NOTE: Output for this command is lengthy. To control whether the output halts after each full screen to wait for keyboard input, enable or disable the pager parameter of the `set cli-parameters` command.

Min. role `monitor`

Syntax `show configuration`

- Output
- System information from [show system](#)
 - Controller information from [show controllers](#)
 - Controller firmware and hardware version information from [show versions](#) with the `detail` parameter
 - Host and expansion port information from [show ports](#)
 - Disk information from [show disks](#)
 - Disk-slot information from [show disks](#) with the `encl` parameter
 - Vdisk information from [show vdisks](#)
 - Disk-group information from [show disk-groups](#)
 - Pool information from [show pools](#)
 - Enclosure information from [show enclosures](#)
 - Field-replaceable unit (FRU) information from [show frus](#)

Show information about the system configuration.

```
# show configuration
```

- Basetypes
- [system](#)
 - [controllers](#)
 - [versions](#)
 - [port](#)
 - [drives](#)
 - [enclosure-list](#)
 - [virtual-disks](#)
 - [disk-groups](#)
 - [pools](#)
 - [enclosures](#)
 - [enclosure-fru](#)
 - [status](#)

show controller-date

Description Shows the system's current date and time.

Min. role monitor

Syntax show controller-date

Output Controller Date

Date and time in the format *year-month-day hour:minutes:seconds*.

Time-Zone Offset

The system's time zone as an offset in hours and minutes from Coordinated Universal Time (UTC). This is shown only if NTP is enabled.

Example Show the system date and time.

```
# show controller-date
```

Basetypes

- [time-settings-table](#)
- [status](#)

See also

- [set controller-date](#)
- [set ntp-parameters](#)
- [show ntp-status](#)

show controllers

Description Shows information about each controller module in the storage system.

Min. role monitor

Syntax show controllers

Output Controller ID

- A: Controller A.
- B: Controller B.

Serial Number

- Serial number of the controller module.
- Not Available: The controller module is down or not installed.

Hardware Version

Controller module hardware version.

CPLD Version

Complex Programmable Logic Device firmware version.

MAC Address

Controller network port MAC address.

WWNN

Storage system World Wide Node Name (WWNN).

IP Address

Controller network port IP address.

IP Subnet Mask

Controller network port IP subnet mask.

IP Gateway

Controller network port gateway IP address.

Disks

Number of disks in the storage system.

Virtual Pools

Number of virtual pools in the storage system.

Disk Groups (v3)

Number of disk groups in the storage system.

Vdisks (v2)

Number of vdisks in the storage system.

Cache Memory Size (MB)

Controller module cache memory size (MB).

Host Ports

Number of host ports in the controller module.

Disk Channels

Number of expansion ports in the controller enclosure.

Disk Bus Type

Type of interface between the controller module and disks:

- SAS

Status

- Operational
- Down
- Not Installed
- Unknown

Failed Over to This Controller

Indicates whether the partner controller has failed over to this controller:

- No: The partner controller has not failed over to this controller.
- Yes: The partner controller has either failed or been shut down, and its responsibilities have been taken over by this controller. There will be a delay between the time that the value of `Status` becomes `Down` for one controller and the time that the value of `Failed Over to This Controller` becomes `Yes` for the other controller. This time period is the time that it takes for a controller to take over the responsibilities of its partner.

Fail Over Reason

If `Failed Over to This Controller` is `Yes`, a reason for the failover appears; otherwise, `Not applicable` appears.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

If `Health` is not `OK`, this field shows the reason for the health state.

Health Recommendation

If `Health` is not `OK`, this field shows recommended actions to take to resolve the health issue.

Position

Position of the controller in the enclosure:

- Top: The controller is in the top slot.
- Bottom: The controller is in the bottom slot.

Phy Isolation

Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller.

- Enabled: PHY fault isolation is enabled. This is the default.
- Disabled: PHY fault isolation is disabled.

Controller Redundancy Mode

Shows the system's operating mode, also called the cache redundancy mode:

- **Independent Cache Performance Mode:** For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- **Active-Active ULP:** Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- **Single Controller:** The enclosure contains a single controller.
- **Failed Over:** Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- **Down:** Both controllers are not operational.

Controller Redundancy Status

- **Redundant with independent cache:** Both controllers are operational but are not mirroring their cache metadata to each other.
- **Redundant:** Both controllers are operational.
- **Operational but not redundant:** In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.
- **Down:** This controller is not operational.
- **Unknown:** Status information is not available.

Example Show controller information.

```
# show controllers
```

Basetypes

- [controllers](#)
- [status](#)

See also

- [show configuration](#)
- [show frus](#)

show controller-statistics

Description Shows live performance statistics for controller modules. For controller performance statistics, the system samples live data every 15 seconds.

Statistics shown only in XML API output are described in "[XML API basetype properties](#)" (page 376).

Min. role monitor

Syntax show controller-statistics
[a|b|both]

Parameters a|b|both
Optional. Specifies whether to show information for controller A, B, or both. If this parameter is omitted, information is shown for both controllers.

Output

Durable ID
The controller ID in the form `controller_ID`.

CPU Load
The percentage of time the CPU is busy, from 0 to 100.

Power On Time (Secs)
The number of seconds since the controller was restarted.

Bytes per second
The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS
The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads
The number of read operations since these statistics were last reset or since the controller was restarted.

Writes
The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read
The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written
The amount of data written since these statistics were last reset or since the controller was restarted.

Num Forwarded Cmds
The current count of commands that are being forwarded or are queued to be forwarded to the partner controller for processing. This value will be zero if no commands are being forwarded or are queued to be forwarded.

Reset Time
The date and time, in the format `year-month-day hour:minutes:seconds`, when these statistics were last reset, either by a user or by a controller restart.

Total Power On Hours
The total amount of hours the controller has been powered on in its life time.

Example Show statistics for controller A.

```
# show controller-statistics a
```

Basetypes

- [controller-statistics](#)
- [status](#)

See also

- [reset all-statistics](#)
- [reset controller-statistics](#)

show debug-log-parameters

Description Shows which debug message types are enabled (On) or disabled (Off) for inclusion in the Storage Controller debug log. For use by or with direction from technical support.

Min. role monitor

Syntax `show debug-log-parameters`

Output

- `host`: Host interface debug messages. Enabled by default.
- `disk`: Disk interface debug messages. Enabled by default.
- `mem`: Internal memory debug messages. Disabled by default.
- `fo`: Failover and recovery debug messages. Enabled by default.
- `msg`: Inter-controller message debug messages. Enabled by default.
- `ioa`: I/O interface driver debug messages (standard). Enabled by default.
- `iob`: I/O interface driver debug messages (resource counts). Disabled by default.
- `ioc`: I/O interface driver debug messages (upper layer, verbose). Disabled by default.
- `ioid`: I/O interface driver debug messages (lower layer, verbose). Disabled by default.
- `misc`: Internal debug messages. Enabled by default.
- `rcm`: Removable-component manager debug messages. Disabled by default.
- `raid`: RAID debug messages. Enabled by default.
- `cache`: Cache debug messages. Enabled by default.
- `emp`: Enclosure Management Processor debug messages. Enabled by default.
- `capi`: Internal Configuration API debug messages. Enabled by default.
- `mui`: Internal service interface debug messages. Enabled by default.
- `bkcfg`: Internal configuration debug messages. Enabled by default.
- `awt`: Auto-write-through cache triggers debug messages. Disabled by default.
- `res2`: Internal debug messages. Disabled by default.
- `capi2`: Internal Configuration API tracing debug messages. Disabled by default.
- `dms`: Snapshot feature debug messages. Enabled by default.
- `fruid`: FRU ID debug messages. Enabled by default.
- `resmgr`: Reservation Manager debug messages. Disabled by default.
- `init`: Not used.
- `ps`: Paged storage. Enabled by default.
- `hb`: Not used.

Example Show debug log parameters.

```
# show debug-log-parameters
```

Basetypes

- [debug-log-parameters](#)
- [status](#)

See also

- [set debug-log-parameters](#)

show disk-groups

Description Shows information about disk groups. The command will show information for all disk groups by default, or you can use parameters to filter the output.

Min. role monitor

Syntax show disk-groups
 [pool *pool*]
 [*disk-groups*]

Parameters *pool pool*
Optional. Specifies the name or serial number of the pool that contains the disk groups for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for disk groups in all pools.

disk-groups
Optional. A comma-separated list of the names or serial numbers of the disk groups for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all disk groups.

Output Properties are described in alphabetical order.

% of Pool
The percentage of pool capacity that the disk group occupies.

Action
If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Chk

- For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the disk group.
- For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).
- For RAID 50, the disk-group chunk size calculated as: *configured-chunk-size* x (*subgroup-members* - 1). For a disk group configured to use 32-KB chunk size and 4-disk subgroups, the value would be 96k (32KB x 3).

Class

- **Linear:** The disk group acts as a linear pool.
- **Virtual:** The disk group is in a virtual pool.

Disks
The number of disks in the disk group.

Free
The amount of free space in the disk group, formatted to use the current base, precision, and units.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Job%

- 0%-99%: Percent complete of running job
- Blank if no job is running (job has completed)

Jobs

Shows whether a job is running and its percent complete.

- CPYBK: The disk group is being used in a copyback operation.
- DRSC: A disk is being scrubbed.
- EXPD: The disk group is being expanded.
- INIT: The disk group is initializing.
- RCON: The disk group is being reconstructed.
- VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.
- VPREP: The virtual disk group is being prepared for use in a virtual pool.
- VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.
- VREMV: The disk group and its data are being removed.
- VRFY: The disk group is being verified.
- VRSC: The disk group is being scrubbed.
- Blank if no job is running.

Name

The name of the disk group.

Own

Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.

Pool

The name of the pool that contains the disk group.

Pref

Controller that owns the disk group and its volumes during normal operation.

RAID

The RAID level of the disk group.

Reason

If Health is not OK, this field shows the reason for the health state.

SD Delay

For a linear disk group, the period of inactivity after which the disks and dedicated spares will automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.

Serial Number

The serial number of the disk group.

Size

The capacity of the disk group, formatted to use the current base, precision, and units.

Spin Down

- Disabled: DSD is disabled for the disk group. This is the default.
- Enabled - all spinning: DSD is enabled for the disk group.
- Partial spin-down: DSD is enabled for the disk group and its disks are partially spun down to conserve power.
- Full spin-down: DSD is enabled for the disk group and its disks are fully spun down to conserve power.

Spr

For a linear disk group, the number of spares assigned to the group.

Status

- **CRIT:** Critical. The disk group is online but isn't fault tolerant because some of its disks are down.
- **DMGD:** Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.
- **FTDN:** Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down.
- **FTOL:** Fault tolerant and online.
- **MSNG:** Missing. The disk group is online and fault tolerant, but some of its disks are missing.
- **OFFL:** Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost.
- **QTCR:** Quarantined critical. The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.
- **QTDN:** Quarantined with a down disk. The RAID-6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.
- **QTOF:** Quarantined offline. The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 disk group.
- **STOP:** The disk group is stopped.
- **UNKN:** Unknown.
- **UP:** Up. The disk group is online and does not have fault-tolerant attributes.

Tier

- **Performance:** The disk group is in the highest storage tier, which uses SSDs (high speed, low capacity).
- **Standard:** The disk group is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
- **Archive:** The disk group is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).
- **Read Cache:** The disk is an SSD providing high-speed read cache for a storage pool.

Example Show information about all disk groups.

```
# show disk-groups pool A
```

Show information about disk group dg0002 in pool B.

```
# show disk-groups pool B dg0002
```

Basetypes

- [disk-groups](#)
- [status](#)

See also

- [show disks](#)
- [show pools](#)

show disk-group-statistics

Description Shows live performance statistics for disk groups. The command will show information for all disk groups by default, or you can use parameters to filter the output. For disk-group performance statistics, the system samples live data every 30 seconds.

Properties shown only in XML API format are described in ["XML API basetype properties"](#) (page 376).

Min. role monitor

Syntax `show disk-group-statistics`
`[disk-group disk-group]`
`[type linear|virtual]`

Parameters `disk-group disk-group`
Optional. Specifies the disk group for which to show information. If this parameter is omitted, information will be shown for all disk groups. A value that includes a space must be enclosed in double quotes.

`type linear|virtual`

Optional. Specifies whether to show information for linear disk groups or for virtual disk groups. If this parameter is omitted, information will be shown for both types.

Output Name

The name of the disk group.

Time (ms) Since Reset

The amount of time, in milliseconds, since these statistics were last reset, either by a user or by a controller restart.

Reads

Number of read operations since these statistics were last reset or since the controller was restarted.

Writes

Number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

Amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

Amount of data written since these statistics were last reset or since the controller was restarted.

Bytes per second

Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

I/O Resp Time

Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.

Read Resp Time

Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.

Write Resp Time

Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.

Pages Allocated per Min

Shown for a virtual disk group. The rate, in pages per minute, at which pages are allocated to volumes in the disk group because they need more space to store data.

Pages Deallocated per Min

Shown for a virtual disk group. The rate, in pages per minute, at which pages are deallocated from volumes in the disk group because they no longer need the space to store data.

Pages Reclaimed

Shown for a virtual disk group. The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).

Pages Unmapped per Minute

Shown for a virtual disk group. The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI unmap command, to free storage space as a result of deleting files or formatting volumes on the host.

Example Show live performance statistics for all disk groups.

```
# show disk-group-statistics
```

Show live performance statistics for disk group dg0001.

```
# show disk-group-statistics dg0001
```

Basetypes

- [disk-group-statistics](#)
- [status](#)

See also

- [reset all-statistics](#)
- [reset disk-group-statistics](#)
- [show disk-groups](#)
- [show disk-statistics](#)

show disk-parameters

Description Shows disk settings.

Min. role monitor

Syntax `show disk-parameters`

Output SMART

Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.

- **Detect-Only:** Each disk in the system retains its individual SMART setting, as will new disks added to the system.
- **Enabled:** SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.
- **Disabled:** SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

Drive Write Back Cache

- **Disabled:** Disk write-back cache is disabled for all disks in the system and will be disabled for new disks added to the system. This parameter cannot be changed.

Timeout Retry Maximum

Maximum number of times a timed-out I/O operation can be retried before the operation is failed.

Attempt Timeout

Number of seconds before an I/O operation is aborted and possibly retried.

Overall Timeout

Total time in seconds before an I/O operation is failed regardless of the `Attempt Timeout` and `Timeout Retry Maximum` settings.

Inactive Drive Spin Down

Shows whether available disks and global spares will spin down after a period of inactivity shown by the `Inactive Drive Spin Down Delay` field.

- **Disabled:** Drive spin down for available disks and global spares is disabled. This is the default.
- **Enabled:** Drive spin down for available disks and global spares is enabled.

Inactive Drive Spin Down Delay

Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.

Example Show disk settings.

```
# show disk-parameters
```

Basetypes

- [drive-parameters](#)
- [status](#)

See also

- [set disk-parameters](#)

show disks

Description Shows information about all disks or disk slots in the storage system. If no parameter is specified, the command shows information for all installed disks.

NOTE: In console format, to aid reading, disks are sorted to display in order by enclosure and disk number. In API formats, output is not sorted because it is expected to be manipulated by a host application.

Min. role monitor

Syntax To show information about disks:

```
show disks
    [disk-group disk-group] | [vdisk vdisk] | [disks]
    [detail] | [fde] | [perf] | [temp]
```

To show information about all disk slots:

```
show disks encl
```

Parameters detail

Optional. This parameter shows additional detail about the disk.

disk-group disk-group

Optional. The name or serial number of the disk group that contains the disks about which to show information. A value that includes a space must be enclosed in double quotes.

encl

Optional. Shows information about each disk slot, whether it contains a disk or not. If you specify this parameter with other parameters, they will be ignored.

fde

Optional. For all or specified disks, this option shows Full Disk Encryption information. Information shown includes the FDE state and lock key ID.

perf

Optional. For all or specified disks, this parameter shows performance statistics from the latest historical sample for each disk. Statistics shown include total I/Os (reads and writes), total amount of data transferred, and average I/O response time.

temp

Optional. Shows the temperature for all installed disks.

vdisk *vdisk*

Optional. Shows information about disks in the specified vdisk. A name that includes a space must be enclosed in double quotes.

disks

Optional. Either:

- A comma-separated list of the IDs or serial numbers of disks about which to show information. For disk syntax, see ["Command syntax" \(page 23\)](#).
- `all`: Shows information about all installed disks.
- `free`: Shows information about all disks that are available.

Output Properties are described in alphabetical order.

Action

Shown by default or by the `fde` or `perf` parameter. If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Copyback State

Shown by the `detail` parameter. The state of the disk (source or destination) if it is involved in a copyback operation.

- `From`: This disk is being used as the source of a copyback operation.
- `To`: This disk is being used as the target of a copyback operation.
- `N/A`: This disk is not being used in a copyback operation.

Current Job

Shown by the `detail` parameter. See `Jobs`, below.

Data Transferred

Shown by the `perf` parameter. The total number of bytes transferred.

Description

Shown by default or by the `detail` or `fde` or `perf` parameter.

- `SAS`: Enterprise SAS
- `SAS MDL`: Midline SAS
- `sSAS`: SAS SSD

Disk Group (v3)

Shown by default or by the `detail` parameter. The name of the disk group that contains the disk.

Drive Spin Down Count

Shown by the `detail` parameter. The number of times the DSD feature has spun down this disk.

Encl

Shown by the `encl` parameter. The number of the enclosure where the disk is located.

FDE State

Shown by the `detail` or `fde` parameter. The FDE state of the disk:

- `Unknown`: The FDE state is unknown.
- `Not FDE Capable`: The disk is not FDE-capable.
- `Not Secured`: The disk is not secured.
- `Secured, Unlocked`: The system is secured and the disk is unlocked.
- `Secured, Locked`: The system is secured and the disk is locked to data access, preventing its use.
- `FDE Protocol Failure`: A temporary state that can occur while the system is securing the disk.

Health

Shown by default or by the `detail` or `fde` or `perf` parameter.

- `OK`
- `Degraded`
- `Fault`
- `N/A`
- `Unknown`

Health Reason

Shown by the `detail` parameter. See `Reason`, below.

Health Recommendation

Shown by the `detail` parameter. See `Action`, above.

I/O Resp Time

Shown by the `perf` parameter. The average time in microseconds to complete I/O.

Jobs

Shown by default.

- **CPYBK:** The disk is being used in a copyback operation.
- **DRSC:** The disk is being scrubbed.
- **EXPD:** The disk group is being expanded.
- **INIT:** The disk group is being initialized.
- **RCON:** The disk group is being reconstructed.
- **VDRAIN:** The virtual disk group is being removed and its data is being drained to another disk group.
- **VPREP:** The virtual disk group is being prepared for use in a virtual pool.
- **VRECV:** The virtual disk group is being recovered to restore its membership in the virtual pool.
- **VREMV:** The disk group and its data are being removed.
- **VRFY:** The disk group is being verified.
- **VRSC:** The disk group is being scrubbed.
- Blank if no job is running.

LED Status

Shown by the `detail` parameter. The disk LED status:

- **Rebuild:** The disk's disk group is being reconstructed.
- **Fault:** The disk has a fault.
- **ID:** The locator LED is illuminated to identify the disk.
- **Remove:** The disk is ready to be removed from the enclosure.
- Blank if the disk is not part of a vdisk or is spun down.

Location

Shown by default and by any parameter except `encl`. The disk location in the format *enclosure-ID.slot-number*.

Lock Key ID

Shown by the `fde` parameter. The current lock key ID.

Model

Shown by the `encl` parameter. The model number of the disk.

Pool

Shown by default. The name of the pool that contains the disk.

Pool Name

Shown by the `detail` parameter. See `Pool`, above.

Power On Hours

Shown by the `detail` parameter. The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.

Reason

Shown by default or by the `detail` or `fde` or `perf` parameter. If Health is not OK, this field shows the reason for the health state.

Recon State

Shown by the `detail` parameter. The state of the disk (source or destination) if it is involved in a reconstruct operation.

- **From:** This disk is being used as the source of a reconstruct operation.
- **To:** This disk is being used as the target of a reconstruct operation.
- **N/A:** This disk is not being used in a reconstruct operation.

Rev

Shown by default or by the `detail` or `fde` or `perf` parameter. The firmware revision number.

Revision

Shown by the `detail` parameter. See `Rev`, above.

Serial Number

Shown by default and by any parameter except `temp`. The serial number of the disk.

Single Pathed

Shown by the `detail` parameter.

- `A or B`: A dual-ported disk is communicating through a single port to the connected controller. A failure is preventing communication through the second port to the other controller.
- `(blank)`: The disk is operating normally.

Size

Shown by default and by any parameter except `fde` or `temp`. The disk capacity, formatted to use the current base, precision, and units.

Slot

Shown by the `encl` parameter. The slot number in the enclosure where the disk is located.

SMART

Shown by the `detail` parameter. Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.

- `Detect-Only`: Each disk in the system retains its individual SMART setting, as will new disks added to the system.
- `Enabled`: SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.
- `Disabled`: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

Speed (kr/min)

Shown by default or by the `detail` or `fde` or `perf` parameter. The speed of a spinning disk, in thousands of revolutions per minute, as specified by the disk vendor. For an SSD, 0 is shown.

SSD Life Remaining%

Shown by the `detail` parameter.

- `100%-0%`: For an SSD, this field shows the percentage of disk life remaining. When the value decreases to 20%, event 502 is logged with Informational severity. Event 502 is logged again with Warning severity when the value decreases to 5%, 2%, and 0%.
- `N/A`: The disk is not an SSD.

Status

Shown by the `encl` parameter.

- `Up`: The disk is present and is properly communicating with the expander.
- `Spun Down`: The disk is present and has been spun down by the drive spin down feature.
- `Warning`: The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in `Error` status.
- `Error`: The disk is present but is not detected by the expander.
- `Unknown`: Initial status when the disk is first detected or powered on.
- `Not Present`: The disk slot indicates that no disk is present.
- `Unrecoverable`: The disk is present but has unrecoverable errors.
- `Unavailable`: The disk is present but cannot communicate with the expander.
- `Unsupported`: The disk is present but is an unsupported type.

Temperature

Shown by the `detail` or `temp` parameter. The temperature of the disk.

Temperature Status

Shown by the `temp` parameter.

- **OK:** The disk sensor is present and detects no error condition.
- **Warning:** The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds.
- **Critical:** The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold.
- **Unknown:** The disk sensor is present but status is not available.

Tier

Shown by default or by the `detail` parameter.

- **Performance:** The disk is in the highest storage tier, which uses SSDs (high speed, low capacity).
- **Standard:** The disk is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
- **Archive:** The disk is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).
- **Read Cache:** The disk is an SSD providing high-speed read cache for a storage pool.

Total I/Os

Shown by the `perf` parameter. The total number of I/O operations (reads and writes).

Transfer Rate

Shown by the `detail` parameter. The data transfer rate in Gbit/s. A footnote indicates that it is normal behavior for the rate to vary.

Some 6-Gbit/s disks might not consistently support a 6-Gbit/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3 Gbit/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.

Usage

Shown by default or by the `detail` parameter

- **AVAIL:** Available
- **DEDICATED SP:** The disk is a spare assigned to a linear disk group.
- **FAILED:** The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.
- **GLOBAL SP:** The disk is a global spare.
- **LEFTOVR:** The disk is a leftover.
- **LINEAR POOL:** The disk is a member of a vdisk.
- **UNUSABLE:** The disk cannot be used in a disk group because the system is secured or because the disk is locked to data access.
- **VDISK:** The disk is a member of a vdisk.
- **VDISK SP:** The disk is a spare assigned to a vdisk.
- **VIRTUAL POOL:** The disk is a member of a disk group in a storage pool.

Vdisk (v2)

Shown by default or by the `detail` parameter. The name of the vdisk that contains the disk.

Vendor

Shown by default and by any parameter except `temp`. The vendor of the disk.

Example Show disk information.

```
# show disks
```

Show disk-slot information.

```
# show disks encl
```

Show disk performance statistics.

```
# show disks perf
```

Show Full Disk Encryption information.

```
# show disks fde
```

Show disk temperature information.

```
# show disks temp
```

Show detailed information for disk 1.1:

```
# show disks 1.1 detail
```

Basetypes • [drives](#)
• [enclosure-list](#)
• [status](#)

See also • [show disk-groups](#)
• [show vdisks](#)

show disk-statistics

Description Shows live or historical performance statistics for disks. For disk performance statistics, the system samples live data every 15 seconds and historical data every quarter hour, and retains historical data for 6 months.

The historical option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters. If both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

Statistics shown only in XML API output are described in "[XML API basetype properties](#)" (page 376).

Min. role monitor

Syntax To show live statistics:

```
show disk-statistics
    [disks]
```

To show historical statistics:

```
show disk-statistics
    [all]
    [count number-of-data-samples]
    historical
    [time-range "date/time-range"]
    disks
```

Parameters all

Optional. Specifies to show the full set of performance metrics. If this parameter is omitted, the default set of performance metrics will be shown.

`count number-of-data-samples`

Optional. Specifies the number of data samples to display, from 1 to 100. Each sample will be shown as a separate row in the command output. If this parameter is omitted, 100 samples will be shown. If you specify this parameter, do not specify the `time-range` parameter.

`historical`

Optional. Specifies to show historical statistics. If this parameter is omitted, live statistics will be shown.

`time-range "date/time-range"`

Optional. Specifies the date/time range of historical statistics to show, in the format "`start yyyy-mm-dd hh:mm [AM|PM] end yyyy-mm-dd hh:mm [AM|PM]`". If the start date/time is specified but no end date/time is specified, the current date/time will be used as the end date/time. The system will return the oldest sample taken after the start time and the latest sample taken before the end time. If the specified start date/time is earlier than the oldest sample, that sample will be used as the start date/time. If you specify this parameter, do not specify the `count` parameter. If this parameter is omitted, the most recent 100 data samples will be displayed.

`disks`

Optional. Specifies a comma-separated list of disks for which to show information. If this parameter is omitted, information will be shown for all disks. For disk syntax, see "[Command syntax](#)" (page 23).

Output Live

Durable ID

The disk ID in the form `disk_enclosure-number.disk-number`.

Serial Number

The serial number of the disk.

Bytes per second

The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Reset Time

Date and time, in the format *year-month-day hour:minutes:seconds*, when these statistics were last reset, either by a user or by a controller restart.

Output Historical

Durable ID

The disk ID in the form *disk_enclosure-number.disk-number*.

Serial Number

The serial number of the disk.

Total I/Os

The total number of read and write operations since the last sampling time.

Reads

Shown by the *all* parameter. The number of read operations since the last sampling time.

Writes

Shown by the *all* parameter. The number of write operations since the last sampling time.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the *all* parameter. The amount of data read since the last sampling time.

Data Written

Shown by the *all* parameter. The amount of data written since the last sampling time.

Total IOPS

The total number of read and write operations per second since the last sampling time.

Read IOPS

Shown by the *all* parameter. The number of read operations per second since the last sampling time.

Write IOPS

Shown by the *all* parameter. The number of write operations per second since the last sampling time.

Total B/s

The total data transfer rate, in bytes per second, since the last sampling time.

Read B/s

Shown by the *all* parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the *all* parameter. Data transfer rate, in bytes per second, for write operations since the last sampling time.

Queue Depth

Shown by the `all` parameter. The average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Average I/O Size

Shown by the `all` parameter. The average data size of read and write operations since the last sampling time.

Average Read I/O Size

Shown by the `all` parameter. The average data size of read operations since the last sampling time.

Average Write I/O Size

Shown by the `all` parameter. The average data size of write operations since the last sampling time.

Number of Disk Errors

Shown by the `all` parameter. The total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.

Sample Time

Date and time, in the format `year-month-day hour:minutes:seconds`, when the data sample was taken.

Example Show live statistics for disks 1.1 and 2.1.

```
# show disk-statistics 1.1,2.1
```

Show historical statistics from a specified date and time range for disk 1.5.

```
# show disk-statistics 1.5 historical time-range "start 2011-12-05 4:40 PM end 2011-12-05 5:00 PM"
```

Show all samples of historical statistics for disk 1.5.

```
# show disk-statistics 1.5 historical all
```

Basetypes

- [disk-statistics](#) (live)
- [drive-summary](#) (historical)
- [status](#)

See also

- [reset all-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-statistics](#)
- [show disk-group-statistics](#)
- [show disks](#)

show email-parameters

Description Shows email (SMTP) notification parameters for events and managed logs.

Min. role monitor

Syntax show email-parameters

Output Email Notification

- **Disabled:** Email notification is disabled. This is the default.
- **Enabled:** Email notification is enabled.

Email Notify Filter

Shows the minimum severity for which the system should send event notifications:

- **crit:** Sends notifications for Critical events only.
- **error:** Sends notifications for Error and Critical events.
- **warn:** Sends notifications for Warning, Error, and Critical events.
- **info:** Sends notifications for all events.
- **none:** Disables email notification and clears the settings. This is the default.

This parameter does not apply to managed-logs notifications.

Email Address (1-3)

Shows up to three email addresses for recipients of event notifications.

Log Destination

Shows the email address for the log collection system used by the managed logs feature.

Email Server

The IP address of the SMTP mail server to use for the email messages.

Email Domain

The domain name that, with the sender name, forms the “from” address for remote notification.

Email Sender

The sender name that, with the domain name, forms the “from” address for remote notification.

Include Logs

Shows whether system log files will automatically be attached to email notification messages generated by the managed logs feature. This is the “push” mode for managed logs. This option is disabled by default.

Example Show settings for email notification.

```
# show email-parameters
```

Basetypes

- [email-parameters](#)
- [status](#)

See also

- [set email-parameters](#)

show enclosures

Description Shows information about the enclosures in the storage system. Full detail available in XML API output only.

Min. role monitor

Syntax show enclosures

Output Encl

The enclosure ID.

Encl WWN

The enclosure WWN.

Name

The enclosure name.

Location

The enclosure location, or blank if not set.

Rack

The number of the rack that contains the enclosure.

Pos

The position of the enclosure in the rack

Vendor

The enclosure vendor.

Model

The enclosure model.

EMP *controller-ID* BUS:ID Rev

The channel ID and firmware revision of the Enclosure Management Processor in each controller's Expander Controller.

Midplane Type

- 2U48-6G: Midplane for 2U, 48-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U24-6Gv2: Midplane for 2U, reduced-depth, 24-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U24-6G: Midplane for 2U, 24-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U12-6Gv2: Midplane for 2U, reduced-depth, 12-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U12-6G: Midplane for 2U, 12-disk enclosure with 6-Gbit/s maximum data rate to disks
- N/A: Other type of midplane

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Drawer information:

Drawer

The number of the drawer.

Drawer WWN

The WWN of the drawer.

Name

The name of the drawer.

EMP *controller-ID* CH:ID Rev

The channel ID and firmware revision of the drawer's Enclosure Management Processor for controller module A's Expander Controller.

Status

Status of the drawer.

- Up
- Warning
- Error
- Unknown
- Unavailable
- Not Present

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show information about all enclosures in the system.

```
# show enclosures
```

Basetypes

- [enclosures](#)
- [status](#)

See also

- [set enclosure](#)
- [show sensor-status](#)

show events

Description Shows events logged by each controller in the storage system. A separate set of event numbers is maintained for each controller. Each event number is prefixed with a letter identifying the controller that logged the event.

Events are listed from newest to oldest, based on a timestamp with one-second granularity. Therefore the event log sequence matches the actual event sequence within about one second.

For more information, see “Resources for diagnosing and resolving problems” in the Event Descriptions Reference Guide.

Min. role monitor

Syntax `show events`
 `[a|b|both|error]`
 `[detail]`
 `[from timestamp]`
 `[from-event event-ID]`
 `[last #]`
 `[logs yes|no]`
 `[to timestamp]`
 `[to-event event-ID]`

Parameters `a|b|both|error`

Optional. Specifies to filter the event listing:

- `a`: Shows events from controller A only. Do not use this parameter with the `from-event` parameter or the `to-event` parameter.
- `b`: Shows events from controller B only. Do not use this parameter with the `from-event` parameter or the `to-event` parameter.
- `both`: Shows events from both controllers. Do not use this parameter with the `from-event` parameter or the `to-event` parameter.
- `error`: Shows Warning, Error, and Critical events.

`detail`

Optional. Shows additional information and recommended actions for displayed events. This information is also in the Event Descriptions Reference Guide.

`from timestamp`

Optional. Shows events that occurred on or after a timestamp specified with the format `MMDDYYhhmmss`. For example, `043011235900` represents April 30 2011 at 11:59:00 p.m. This parameter can be used with the `to` parameter or the `to-event` parameter.

`from-event event-ID`

Optional. Shows events including and after the specified event ID. If this number is smaller than the ID of the oldest event, events are shown from the oldest available event. Events are shown only for the controller that the event ID specifies (A or B). This parameter can be used with the `to` parameter or the `to-event` parameter.

`last #`

Optional. Shows the latest specified number of events. If this parameter is omitted, all events are shown.

`logs yes|no`

Optional.

- `no`: Lists events as described in the Output section, below. This is the default.
- `yes`: Shows events in tabular format, with columns for event ID, date and time, event code, severity, and message.

to *timestamp*

Optional. Shows events that occurred on or before a timestamp specified with the format *MMDDYYhhmms.s*. For example, 043011235900 represents April 30 2011 at 11:59:00 p.m. This parameter can be used with the *from* parameter or the *from-event* parameter.

to-event *event-ID*

Optional. Shows events before and including the specified event ID. If this number is larger than the ID of the oldest event, events are shown up to the latest event. Events are shown only for the controller that the event ID specifies (A or B). This parameter can be used with the *from* parameter or the *from-event* parameter.

- Output
- Date and time when the event was logged
 - Event code identifying the type of event to help diagnose problems. For example: [181]
 - Event ID prefixed by A or B, indicating which controller logged the event. For example: #A123
 - Model, serial number, and ID of the controller module that logged the event
 - Severity:
 - CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem *immediately*.
 - ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
 - WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.
 - INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
 - Event-specific message giving details about the event

Example Show the last two events.

```
# show events last 2
```

Show the last three non-Informational events.

```
# show events last 3 error
```

Show all events from April 30 2014 at 11:59:00 p.m. through May 2 2014 at 11:59:00 a.m.

```
# show events from 043014235900 to 050214115900
```

Show a range of events logged by controller A.

```
# show events from-event a100 to-event a123
```

Show detailed output for a specific event.

```
# show events from-event A2264 to-event A2264 detail
```

- Basetypes
- [events](#)
 - [eventsLogs](#)
 - [status](#)

- See also
- [clear events](#)
 - [set snmp-parameters](#)
 - [show snmp-parameters](#)

show expander-status

Description	<p>Shows diagnostic information relating to SAS Expander Controller physical channels, known as PHY lanes. For use by or with direction from technical support.</p> <p>For each enclosure, this command shows status information for PHYs in I/O module A and then I/O module B.</p>
Min. role	monitor
Syntax	show expander-status
Output	<p>Encl The enclosure that contains the SAS expander.</p> <p>Drawer The number of the drawer.</p> <p>Ctlr The I/O module that contains the SAS expander.</p> <p>Phy Identifies a PHY's logical location within a group based on the PHY type. Logical IDs are 0–23 for drive PHYs, 0–1 for SC PHYs, and 0–3 for other PHYs. If the PHY's controller module or expansion module is not installed, this field shows "--".</p> <p>Type</p> <ul style="list-style-type: none">• Drawer0-Egress: Egress PHY for drawer 0.• Drawer0-Ingress: Ingress PHY for drawer 0.• Drawer1-Egress: Egress PHY for drawer 1.• Drawer1-Ingress: Ingress PHY for drawer 1.• Drawer2-Egress: Egress PHY for drawer 2.• Drawer2-Ingress: Ingress PHY for drawer 2.• Drive: 1-lane PHY that communicates between the expander and a disk drive.• Egress: 4-lane PHY that communicates between the expander and an expansion port or SAS Out port.• SC-1: (Controller module only) 2-lane PHY that communicates between the expander and the partner's expander.• SC-0: (Controller module only) 4-lane PHY that communicates between the expander and the SC.• Ingress: (Expansion module only) 4-lane PHY that communicates between the expander and an expansion port.• Inter-Exp: (Expansion module only) Communicates between the expander and the partner's expander.• Undefined: No status information is available.• Unused: The PHY exists in the expander but is not connected, by design. <p>Status</p> <ul style="list-style-type: none">• Enabled - Healthy: The PHY is enabled and healthy.• Enabled - Degraded: The PHY is enabled but degraded.• Disabled: The PHY has been disabled by a user or by the system.

Elem Status

A standard SES status for the element:

- **Disabled:** Critical condition is detected.
- **Error:** Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data.
- **Non-critical:** Non-critical condition is detected.
- **Not Used:** Element is not installed in enclosure.
- **OK:** Element is installed and no error conditions are known.
- **Unknown:** Either:
 - Sensor has failed or element status is not available. Appears only if an I/O module indicates it has fewer PHYs than the reporting I/O module, in which case all additional PHYs are reported as unknown.
 - Element is installed with no known errors, but the element has not been turned on or set into operation.

Disabled

- **Enabled:** PHY is enabled.
- **Disabled:** PHY is disabled.

Reason

- **Blank if Elem Status is OK.**
- **Error count interrupts:** PHY disabled because of error-count interrupts.
- **Phy control:** PHY disabled by a SES control page as a result of action by a Storage Controller or user.
- **Not ready:** PHY is enabled but not ready. Appears for SC-1 PHYs when the partner I/O module is not installed. Appears for Drive, SC-1, or Ingress PHYs when a connection problem exists such as a broken connector.
- **Drive removed:** PHY disabled because drive slot is empty.
- **Unused - disabled by default:** PHY is disabled by default because it is not used.
- **Excessive Phy changes:** PHY is disabled because of excessive PHY change counts.

Example Show expander status for each enclosure.

```
# show expander-status
```

Basetypes

- [sas-status-controller-a](#)
- [sas-status-drawer](#)
- [status](#)

See also

- [clear expander-status](#)
- [set expander-fault-isolation](#)
- [set expander-phy](#)

show fans

Description Shows information about each fan in the storage system.

Min. role monitor

Syntax show fans

Output Name

The fan name in the form `Fan loc:position-PSU power-supply-ID`. The position is as viewed from the back of the enclosure.

Location

The fan location in the form `Enclosure enclosure-ID - position`. The position is as viewed from the back of the enclosure.

Status

- Up
- Error
- Off
- Unknown

Speed

The fan speed (revolutions per minute).

Position

The fan position, as viewed from the back of the enclosure:

- Left
- Right

Serial Number

- (blank): Not applicable.

Firmware Version

- (blank): Not applicable.

Hardware Version

- (blank): Not applicable.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show about all fans in the system.

```
# show fans
```

Basetypes

- [fan](#)
- [status](#)

See also

- [show power-supplies](#)

show fde-state

Description Shows Full Disk Encryption information for the storage system.

Min. role monitor

Syntax `show fde-state`

Output FDE Security Status

- **Unsecured.** The system has not been secured with a passphrase.
- **Secured.** The system has been secured with a passphrase.
- **Secured, Lock Ready.** The system has been secured and lock keys are clear. The system will become locked after the next power cycle.
- **Secured, Locked.** The system is secured and the disks are locked to data access, preventing their use.

Lock Key ID

The current lock ID is displayed.

Import Key ID

The previous or import lock ID is displayed.

FDE Configuration Time

If the system is secured, the time at which the current lock ID was set.

Example Show FDE information.

```
# show fde-state
```

Basetypes

- [fde-state](#)
- [status](#)

See also

- [clear fde-keys](#)
- [set fde-import-key](#)
- [set fde-lock-key](#)
- [set fde-state](#)

show frus

Description Shows FRU (field-replaceable unit) information for the storage system. Some information is for use by service technicians.

Min. role monitor

Syntax show frus

Output FRU fields:

Name

- CHASSIS_MIDPLANE: Chassis and midplane circuit board
- RAID_IOM: Controller module
- BOD_IOM: Expansion module
- POWER_SUPPLY: Power supply module
- DRAWER: Enclosure disk drawer

Description

The FRU description.

Part Number

The FRU part number.

Serial Number

The FRU serial number.

Revision

The hardware revision level.

Dash Level

The FRU template revision number.

FRU Shortname

A short description of the FRU.

Manufacturing Date

The date and time in the format *year-month-day hour:minutes:seconds* when a PCBA was programmed or a power supply module was manufactured.

Manufacturing Location

The city, state/province, and country where the FRU was manufactured.

Manufacturing Vendor ID

The JEDEC ID (global manufacturing code) of the manufacturer.

FRU Location

The location of the FRU in the enclosure:

- MID-PLANE SLOT: Chassis midplane
- UPPER IOM SLOT: Controller module or expansion module A
- LOWER IOM SLOT: Controller module or expansion module B
- LEFT PSU SLOT: Power supply module on the left, as viewed from the back
- RIGHT PSU SLOT: Power supply module on the right, as viewed from the back
- LEFT DRAWER SLOT: Drawer on the left, as viewed from the front.
- MIDDLE DRAWER SLOT: Drawer in the middle, as viewed from the front.
- RIGHT DRAWER SLOT: Drawer on the right, as viewed from the front.

Configuration SN

The configuration serial number.

FRU Status

- **Absent:** Component is not present
- **Fault:** One or more subcomponents has a fault
- **Invalid Data:** For a power supply module, the EEPROM is improperly programmed
- **OK:** All subcomponents are operating normally
- **Not Available:** Status is not available

Enclosure ID

The enclosure number.

Original SN

For a power supply module, the original manufacturer serial number. Otherwise, N/A.

Original PN

For a power supply module, the original manufacturer part number. Otherwise, N/A.

Original Rev

For a power supply module, the original manufacturer hardware revision. Otherwise, N/A.

Example Show information about all FRUs in the system.

```
# show frus
```

Basetypes

- [enclosure-fru](#)
- [status](#)

show host-groups

Description Shows information about host groups and hosts. The command will show information for all host groups (and hosts) by default, or you can use parameters to filter the output.

Min. role monitor

Syntax `show host-groups`
`[hosts hosts]`
`[groups host-groups]`

Parameters `hosts hosts`

Optional. A comma-separated list of the names of hosts for which to show host and initiator information. If this parameter is omitted, information is shown for all hosts. A value that includes a space must be enclosed in double quotes.

`groups host-groups`

Optional. A comma-separated list of the names of host groups for which to show host-group, host, and initiator information. If this parameter is omitted, information is shown for all host groups. A value that includes a space must be enclosed in double quotes.

Output Host group information:

Name

The name of the host group.

Number of Members

The number of hosts in the host group.

Host information:

Name

The host name.

Number of Members

The number of initiators in the host.

Initiator information:

Nickname

The nickname of the initiator.

Discovered

- **Yes:** The initiator was discovered and its entry was automatically created.
- **No:** The initiator was manually created.

Mapped

Shows whether the initiator is explicitly mapped to any volumes:

- **Yes:** At least one volume is explicitly mapped to the initiator.
- **No:** No volumes are explicitly mapped to the initiator.

ID

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

Example Show information about all host groups.

```
# show host-groups
```

```
Show information about host groups HGroup1 and HGroup3.
```

```
# show host-groups groups HGroup1,HGroup3
```

Basetypes • [host-group](#)
• [status](#)

See also • [create host-group](#)
• [delete host-groups](#)
• [set host-group](#)

show host-maps (Deprecated)

Use [show maps](#) with the `initiator` parameter.

show host-parameters (Deprecated)

Use [show ports](#).

show host-port-statistics

Description Shows live performance statistics for each controller host port. For each host port these statistics quantify I/O operations through the port between a host and a volume. For example, each time a host writes to a volume's cache, the host port's statistics are adjusted. For host-port performance statistics, the system samples live data every 15 seconds.

Statistics shown only in XML API output are described in ["XML API basetype properties" \(page 376\)](#).

Min. role monitor

Syntax `show host-port-statistics`
`[ports ports]`

Parameters `ports ports`
Optional. Specifies a comma-separated list of port IDs for which to show information. For port syntax, see ["Command syntax" \(page 23\)](#). If this parameter is omitted, information is shown for all host ports.

Output

`Durable ID`
The host port ID in the form `hostport_controller-ID-and-port-number`.

`Bytes per second`
The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

`IOPS`
The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

`Reads`
The number of read operations since these statistics were last reset or since the controller was restarted.

`Writes`
The number of write operations since these statistics were last reset or since the controller was restarted.

`Data Read`
The amount of data read since these statistics were last reset or since the controller was restarted.

`Data Written`
The amount of data written since these statistics were last reset or since the controller was restarted.

`Queue Depth`
The number of pending I/O operations being serviced.

`I/O Resp Time`
The average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.

`Read Resp Time`
The average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.

`Write Resp Time`
The average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.

`Reset Time`
The date and time, in the format `year-month-day hour:minutes:seconds`, when these statistics were last reset, either by a user or by a controller restart.

Example Show live performance statistics for all host ports.

```
# show host-port-statistics

Show live performance statistics for host port A1.
# show host-port-statistics ports a1
```

- Basetypes • [host-port-statistics](#)
• [status](#)

- See also • [reset all-statistics](#)
• [reset host-port-statistics](#)
• [show ports](#)

show hosts (Deprecated)

Use [show initiators](#).

show initiators

Description Shows information about initiators. The command will show information about all initiators by default, or you can use parameters to filter the output.

Initiator entries are automatically created for host initiators that have sent an `inquiry` command or a `report luns` command to the system. This typically happens when the physical host containing an initiator boots up or scans for devices. When the command is received, the system saves the host port information. However, the information is retained after a restart only if you have set a name for the initiator.

Syntax `show initiators`
`[hosts hosts]`
`[initiators]`

Parameters `hosts hosts`
Optional. A comma-separated list of the names of hosts containing initiators for which to show information. If this parameter is omitted, information is shown for all initiators.

`initiators`
Optional. A comma-separated list of the names of initiators for which to show information. If this parameter is omitted, information is shown for all initiators.

Output `Nickname`
The name of the initiator.

`Discovered`

- `Yes`: The initiator was discovered and its entry was automatically created.
- `No`: The initiator was manually created.

`Mapped`

Shows whether the initiator is explicitly mapped to any volumes:

- `Yes`: At least one volume is explicitly mapped to the initiator.
- `No`: No volumes are explicitly mapped to the initiator.

`Host Type`

The host-interface type: FC; iSCSI; SAS.

`ID`

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

Example Show information about all initiators.

```
# show initiators
```

Show information about initiators in host `Host1` only.

```
# show initiators hosts Host1
```

Basetypes

- [initiator](#)
- [status](#)

See also

- [delete initiator-nickname](#)
- [set initiator](#)
- [show host-groups](#) (with the `hosts` parameter)

show inquiry

Description Shows inquiry data for each controller module.

Min. role monitor

Syntax `show inquiry`

Output

- Product vendor name, product ID, and vendor ID
- Management Controller firmware version and loader version
- Storage Controller firmware version and loader version
- Controller module serial number
- Media Access Control (MAC) address
- Network port IP address

Example Show inquiry data for controller modules in the system.

```
# show inquiry
```

Basetypes

- [inquiry](#)
- [status](#)

See also

- [show versions](#)

show iscsi-parameters

Description For iSCSI, shows system-wide iSCSI parameters.

Min. role monitor

Syntax `show iscsi-parameters`

Output CHAP

Shows whether Challenge-Handshake Authentication Protocol (CHAP) is enabled or disabled.

- **Enabled:** CHAP is enabled.
- **Disabled:** CHAP is disabled. This is the default.

Jumbo Frames

Shows whether support for jumbo frames is enabled or disabled.

- **Enabled:** Jumbo-frame support is enabled.
- **Disabled:** Jumbo-frame support is disabled. This is the default.

iSNS

Shows whether support for Internet Storage Name Service (iSNS) is enabled or disabled.

- **Enabled:** iSNS support is enabled.
- **Disabled:** iSNS support is disabled. This is the default.

iSNS IP

The address of the iSNS server. The default address is all zeroes.

iSNS Alt IP

The address of the alternate iSNS server. The default address is all zeroes.

iSCSI Speed

The iSCSI host port link speed.

- **auto:** The proper speed is auto-negotiated. This is the default.
- **1Gbps:** The speed is forced to 1 Gbit/s, overriding a downshift that can occur during auto-negotiation with 1-Gbit/s HBAs. This setting does not apply to 10-Gbit/s HBAs.

iSCSI IP Version

- **4:** iSCSI host port addresses use IPv4 format. This is the default.
- **6:** iSCSI host port addresses use IPv6 format.

Example Show system-wide iSCSI parameters.

```
# show iscsi-parameters
```

Basetypes

- [iscsi-parameters](#)
- [status](#)

See also

- [set iscsi-parameters](#)

show job-parameters (Deprecated)

Use [show advanced-settings](#).

show license

Description Shows the status of licensed features in the storage system.

Min. role monitor

Syntax show license

Output License Key

- The license key, if a license is installed and valid.
- not installed, if a license is invalid or is not installed.

Maximum Licensable Snapshots

Number of snapshots that the highest-level license allows.

Base Maximum Snapshots

Number of snapshots allowed without an installed license.

Licensed Snapshots

Number of snapshots allowed by the installed license.

In-Use Snapshots

Number of existing licensed snapshots.

Snapshots Expire

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

Virtualization

Shows whether the capability to create and manage virtual pools is enabled or disabled.

Virtualization Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

Performance Tier

Shows whether the capability to create a Performance tier comprised of SSDs is enabled or disabled.

Performance Tier Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

Volume Copy

Shows whether Volume Copy functions are enabled or disabled.

Volume Copy Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

Replication

Shows whether AssuredRemote functions are enabled or disabled.

Replication Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

VDS

Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled or disabled.

VDS Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

VSS

Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is enabled or disabled.

VSS Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

SRA

Shows whether Storage Replication Adapter (SRA) support is enabled or disabled.

SRA Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

Example Show information about the installed license.

```
# show license
```

Basetypes

- [license](#)
- [status](#)

See also

- [create temp-license](#)

show maps

Description Shows information about mappings between volumes and initiators. If no parameter is specified, this command shows explicit mappings (but not default mappings) for all volumes.

In a dual-controller system, if a mapping uses corresponding ports on both controllers, such as A1 and B1, the Ports field will simply show 1.

Min. role monitor

Syntax `show maps`
 `[all]`
 `[initiator]`
 `[IDs]`

Parameters all

Optional. Shows mappings of all access types: `read-write`, `read-only`, `no-access`, and `not-mapped` (default mappings). If this parameter is omitted, mappings of type `not-mapped` are not shown.

initiator

Optional. Shows mapping information by initiator. If this parameter is omitted, mapping information is shown by volume.

IDs

Optional. A comma-separated list of the names or serial numbers of host-type items (initiators, hosts, and host groups) or volume-type items (volumes and volume groups) for which to show mappings. If a volume is mapped to a host group, to see mappings you must specify the host group, not a host or initiator in the group. If a volume is mapped to a host, to see mappings you must specify the host, not an initiator in the group.

You can specify:

- A host by name in the format `host-name.*`, where `*` represents all initiators in the host. Example: `FC-Server.*`
- A host group by name in the format `host-group.*.*`, where the first `*` represents all hosts in the group and the second `*` represents all initiators in those hosts. Example: `TestLab.*.*`
- A volume group by name in the format `volume-group.*`, where `*` represents all volumes in the group. Example: `TestVolumes.*`

Do not include both `host-type` and `volume-type` items in a list. A name that includes a space must be enclosed in double quotes.

Output Properties are described in alphabetical order.

Access

Type of host access to the volume:

- `read-write`: Read and write.
- `read-only`: Read only.
- `no-access`: No access (masked).
- `not-mapped`: Not mapped.

Group Name

For a volume group, its name in the format `volume-group.*`, where the `*` represents all volumes in the group.

ID

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

Host-Port-Identifier (v2)

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).
- all other initiators: The volume's default mapping.

Identifier (v3)

See *Host-Port-Identifier*, above.

Initiator-Identifier

Shown for a volume group mapping.

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).
- all other initiators: The volume's default mapping.

LUN

- The LUN that identifies the volume to a host.
- For a volume group, * means multiple LUNs are represented in the group.
- Blank if not mapped or mapped as *no-access*.

Name

The name of a volume or initiator.

Nickname

- For a host, its name in the format *host-name.**, where the * represents all initiators in the host.
- For a host group, its name in the format *host-group.*.**, where the first * represents all hosts in the host group and the second * represents all initiators in those hosts.
- Blank if not set or for all other initiators.

Ports

- The controller host ports to which the mapping applies.
- Blank if not mapped or mapped as *no-access*.

Serial Number

The serial number of the volume group or volume.

Volume

- For a volume, its name.
- For a volume group, its name in the format *volume-group.**, where the * represents all volumes in the group.

Example Show mappings for all volumes.

```
# show maps
```

Show mapping information for all initiators.

```
# show maps initiator
```

Show mappings for volume group *VGroup1* and ungrouped volume *v2*.

```
# show maps VGroup1.*,v2
```

- Basetypes
- [initiator-view](#)
 - [host-group-view](#)
 - [host-view-mappings](#)
 - [volume-group-view](#)
 - [volume-group-view-mappings](#)
 - [volume-view](#)
 - [volume-view-mappings](#)
 - [status](#)

- See also
- [show host-groups](#)
 - [show initiators](#)
 - [show volume-groups](#)
 - [show volumes](#)

show master-volumes

Description	<p>Shows information about master volumes. This command applies to linear storage only.</p> <p>The command will show information for all master volumes by default, or you can use parameters to filter the output.</p>
Min. role	monitor
Syntax	<pre>show master-volumes [controller a b both] [pool pool] [snap-pool snap-pool]</pre>
Parameters	<p><code>controller a b both</code> Optional. Shows master volumes owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, master volumes owned by either controller are shown.</p> <p><code>pool pool</code> Optional. Shows master volumes in the specified pool only. You can specify pool by name or serial number. A name that includes a space must be enclosed in double quotes.</p> <p><code>snap-pool snap-pool</code> Optional. Shows master volumes associated with the specified snap pool only. You can specify the snap pool by name or serial number. A name that includes a space must be enclosed in double quotes</p>
Output	<p>Vdisk The name of the vdisk.</p> <p>Serial Number The serial number of the master volume.</p> <p>Name The name of the master volume.</p> <p>Size Total size of the master volume.</p> <p>Status Indicates whether the master volume is available or unavailable.</p> <p>Status-Reason Shows --- for Available status, or a reason for Unavailable status:</p> <ul style="list-style-type: none">• <code>MV Not Accessible</code>: Master volume is not accessible• <code>MV Not Found</code>: Master volume is not found• <code>RV</code>: Replication volume (either a primary volume or a secondary volume)• <code>RV Prepared</code>: Replication-prepared volume, which could become a secondary volume in a replication set• <code>SP Not Accessible</code>: Snap pool is not accessible• <code>SP Not Found</code>: Snap pool is not found• <code>Unknown Reason</code> <p>Snap-Pool The name of the snap pool.</p> <p>Snapshots The number of snapshots that exist for the master volume.</p>

Snap Data

The amount of snap-pool space occupied by this master volume for its associated snapshots (preserved and write data).

Rollback

Either the percent complete if rollback is in progress, or --- if rollback is not in progress.

Example Show information about all master volumes.

```
# show master-volumes
```

Show information about master volumes associated with snap pool spV1.

```
# show master-volumes snap-pool spV1
```

Basetypes

- [master-volumes](#)
- [status](#)

See also

- [convert master-to-std](#)
- [create master-volume](#)
- [delete all-master-volumes](#)
- [delete volumes](#)
- [expand volume](#)
- [rollback volume](#)

show network-parameters

Description Shows the settings and health of each controller module's network port.

Min. role monitor

Syntax show network-parameters

Output IP Address

The network port IP address.

Gateway

The network port gateway IP address.

Subnet Mask

The network port IP subnet mask.

MAC Address

The controller's unique Media Access Control address.

Addressing Mode

- Manual: Network settings set manually (statically).
- DHCP: DHCP used to set network parameters.

Link Speed

- Unknown: For a system operating in Single Controller mode, this controller module is not present.
- 10mbps: The network port link speed is set to 10 Mb/s.
- 100mbps: The network port link speed is set to 100 Mb/s.
- 1000mbps: The network port link speed is set to 1000 Mb/s.

Duplex Mode

- Undefined: For a system operating in Single Controller mode, this controller module is not present.
- half: The network port duplex mode is set to half duplex.
- full: The network port duplex mode is set to full duplex.

Health

The health of the network connection.

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

If Health is not OK, this field shows the reason for the health state.

Health Recommendation

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show network parameters for each controller module.

```
# show network-parameters
```

Basetypes

- [network-parameters](#)
- [status](#)

See also

- [set network-parameters](#)

show ntp-status

Description Shows the status of the use of Network Time Protocol (NTP) in the system.

Min. role monitor

Syntax show ntp-status

Output NTP Status

- activated: NTP is enabled.
- deactivated: NTP is disabled.

NTP Server Address

- The current NTP server IP address if NTP is enabled.
- The last-set NTP server IP address if NTP was enabled and has been disabled.
- 0.0.0.0 if the NTP server IP address has not been set.

Last Server Contact

The date and time in the format *year-month-day hour:minutes:seconds* of the last message received from the NTP server, or none.

Example Show NTP status for the system.

```
# show ntp-status
```

Basetypes

- [ntp-status](#)
- [status](#)

See also

- [set controller-date](#)

show pools

Description Shows information about linear and virtual pools. The command will show information for all pools by default, or you can use parameters to filter the output. The system can have a maximum of two virtual pools.

NOTE: For a virtual pool, new data will not be written to, or existing data migrated to, a degraded disk group unless it is the only disk group having sufficient available space for the data.

Min. role monitor

Syntax show pools
 [type linear|virtual]
 [pool]

type linear|virtual

Optional. Specifies whether to show information for linear pools or for virtual pools. If this parameter is omitted, information will be shown for both types.

pool

Optional. The name or serial number of the pool for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all pools.

Output Name

The name of the pool.

Serial Number

The serial number of the pool.

Class

- Linear: Linear pool.
- Virtual: Virtual pool.

Total Size

The total capacity of the pool.

Avail

The available capacity in the pool.

OverCommit

- Enabled: The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool.
- Disabled: The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.

Disk Groups

The number of disk groups in the pool.

Volumes

The number of volumes in the pool.

Low Thresh

The low threshold for page allocation as a percentage of pool capacity. When this threshold is reached, event 462 will be logged with Informational severity. The default is 25%.

Mid Thresh

The middle threshold for page allocation as a percentage of pool capacity. When this threshold is reached, event 462 will be logged to notify the administrator to add capacity to the pool. If overcommit is enabled, the event will have Informational severity. If overcommit is disabled, the event will have Warning severity. The default is 50%.

High Thresh

The high threshold for page allocation as a percentage of pool capacity. When this threshold is reached, event 462 will be logged with Critical severity to alert the administrator that it is critical to add capacity to the pool. The threshold value is automatically calculated based on the available capacity of the pool minus 200 GB of reserved space.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show information about all pools.

```
# show pools
```

Show information about virtual pools.

```
# show pools type virtual
```

Basetypes

- [pools](#)
- [disk-groups](#)
- [tiers](#)
- [status](#)

See also

- [delete pools](#)
- [set pool](#)
- [show pool-statistics](#)

show pool-statistics

Description Shows live or historical performance statistics for pools. For pool performance statistics, the system samples live data every 30 seconds and historical data every quarter hour, and retains historical data for 6 months.

The historical option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters. If both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

Statistics shown only in XML API output are described in "[XML API basetype properties](#)" (page 376).

Min. role monitor

Syntax To show live statistics:

```
show pool-statistics
    [pool pools]
    [tier performance|standard|archive|readcache]
```

To show historical statistics:

```
show pool-statistics
    [all]
    [count number-of-data-samples]
    [filename filename.csv]
    historical
    [pool pools]
    [tier performance|standard|archive|readcache]
    [time-range "date/time-range"]
```

Parameters all

Optional. Specifies to show the full set of performance metrics. If this parameter is omitted, the default set of performance metrics will be shown.

`count` *number-of-data-samples*

Optional. Specifies the number of data samples to display, from 1 to 100. Each sample will be shown as a separate row in the command output. If this parameter is omitted, 100 samples will be shown. If you specify this parameter, do not specify the `time-range` parameter.

`filename` *filename.csv*

Optional. Specifies to save historical statistics, in CSV format, to a file on the controller. To access the file, use FTP.

`historical`

Optional. Specifies to show historical statistics. If this parameter is omitted, live statistics will be shown.

`pools` *pools*

Optional. Specifies a comma-separated list the names or serial numbers of the pools for which to show information. If this parameter is omitted, information will be shown for all pools. A name that includes a space must be enclosed in double quotes.

`tier` performance|standard|archive|readcache

Optional. Specifies the tier for which to show statistics.

`time-range` "*date/time-range*"

Optional. Specifies the date/time range of historical statistics to show, in the format "`start yyyy-mm-dd hh:mm [AM|PM] end yyyy-mm-dd hh:mm [AM|PM]`". If the start date/time is specified but no end date/time is specified, the current date/time will be used as the end date/time. The system will return the oldest sample taken after the start time and the latest sample taken before the end time. If the specified start date/time is earlier than the oldest sample, that sample will be used as the start date/time. If you specify this parameter, do not specify the `count` parameter. If this parameter is omitted, the most recent 100 data samples will be displayed.

disks

Optional. Specifies a comma-separated list of disks for which to show information. If this parameter is omitted, information will be shown for all disks. For disk syntax, see "[Command syntax](#)" (page 23).

Output **Live**

Pool

The name of the pool.

Pages Allocated per Min

The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.

Pages Deallocated per Min

The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data.

Pages Unmapped per Minute

The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI unmap command, to free storage space as a result of deleting files or formatting volumes on the host.

Time (ms) Since Reset

The amount of time, in milliseconds, since these statistics were last reset, either by a user or by a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Bytes per second

The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Output **Historical**

For a pool:

Pool

The name of the pool.

Total I/Os

The total number of read and write operations since the last sampling time.

Reads

Shown by the `all` parameter. The number of read operations since the last sampling time.

Writes

Shown by the `all` parameter. The number of write operations since the last sampling time.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the `all` parameter. The amount of data read since the last sampling time.

Data Written

Shown by the `all` parameter. The amount of data written since the last sampling time.

Total IOPS

The total number of read and write operations per second since the last sampling time.

Read IOPS

Shown by the `all` parameter. The number of read operations per second since the last sampling time.

Write IOPS

Shown by the `all` parameter. The number of write operations per second since the last sampling time.

Total B/s

The total data transfer rate, in bytes per second, since the last sampling time.

Read B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the `all` parameter. Data transfer rate, in bytes per second, for write operations since the last sampling time.

Allocated Pages

The number of 4-MB pages allocated to volumes in the pool.

Sample Time

Date and time, in the format `year-month-day hour:minutes:seconds`, when the data sample was taken.

For each tier in the pool:

Pool

The name of the pool.

Tier

The name of the tier.

Total I/Os, Reads, Writes, Data Transferred, Data Read, Data Written, Total IOPS, Read IOPS, Write IOPS, Total B/s, Read B/s, Write B/s
As described for a pool, above.

Allocated Pages

The number of 4-MB pages allocated to volumes in the tier.

Page Moves In

The number of pages moved into this tier from a different tier.

Page Moves Out

The number of pages moved out of this tier to other tiers.

Page Rebalances

The number of pages moved between disks in this tier to automatically load balance.

Initial Allocations

The number of 4-MB pages that are allocated as a result of host writes. This number does not include pages allocated as a result of background tiering page movement. (Tiering moves pages from one tier to another, so one tier will see a page deallocated, while another tier will show pages allocated. These background moves are not considered initial allocations.)

Unmaps

The number of 4-MB pages that are automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).

RC Copies

The number of 4-MB pages copied from spinning disks to SSD read cache (read flash cache).

Sample Time

Date and time, in the format *year-month-day hour:minutes:seconds*, when the data sample was taken.

Example Show live statistics for all pools.

```
# show pool-statistics
```

Show historical statistics from a specified date and time range for pool A.

```
# show pool-statistics pools A historical time-range "start 2014-06-01 4:40 PM  
end 2014-06-01 5:00 PM"
```

Show all samples of historical statistics for the Standard tier in pool A.

```
# show pool-statistics historical all pools A tier standard
```

- Basetypes**
- [pool-statistics](#) (live)
 - [resettable-statistics](#) (live)
 - [tier-statistics](#) (live)
 - [pool-summary](#) (historical)
 - [pool-hist-statistics](#) (historical)
 - [tier-summary](#) (historical)
 - [tier-hist-statistics](#) (historical)
 - [readcache-hist-statistics](#) (historical)
 - [status](#)

- See also**
- [reset all-statistics](#)
 - [reset pool-statistics](#)
 - [show pools](#)

show ports

Description Shows information about host ports in both controllers.

Min. role monitor

Syntax show ports
[detail]

Parameters detail
Optional. This parameter shows additional detail about the port status, including SFP information.

Output Ports
Controller ID and port number

Media

- FC (P) : Fibre Channel Point-to-Point
- FC (L) : Fibre Channel-Arbitrated Loop (public or private)
- FC (-) : Not applicable, as when the port is disconnected
- SAS: Serial Attached SCSI
- iSCSI: Internet SCSI

Target ID
Port WWN or IQN

Status

- Up: The port is cabled and has an I/O link.
- Warning: Not all of the port's PHYs are up.
- Error: The port is reporting an error condition.
- Not Present: The controller module is not installed or is down.
- Disconnected: Either no I/O link is detected or the port is not cabled.

Speed (A)

- Actual link speed in Gbit/s.
- Blank if not applicable.

Speed (C)

Configured host-port link speed. Not shown for SAS.

- FC: Auto, 16Gb, 8Gb, or 4Gb (Gbit/s)
- iSCSI: Auto
- Blank if not applicable

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Topo (C)

FC and SAS only. Configured topology.

Lanes Expected

SAS only. If the `detail` parameter is specified, this field shows the expected number of PHY lanes in the SAS port.

Active Lanes

SAS only. If the `detail` parameter is specified, this field shows the number of active lanes in the SAS port. If the port is connected and fewer lanes are active than are expected, the port status will change to `Warning`, the health will change to `Degraded`, and event 354 will be logged.

PID

FC only. If the `detail` parameter is specified, this field is shown. If the port is using loop topology and the port status is `Up`, this field shows the primary loop ID. If the port is not using loop topology or the port status is not `Up`, this field shows `N/A`.

IP Version

iSCSI only. IPv4 or IPv6.

IP Address

iSCSI only. Assigned port IP address.

Gateway

iSCSI only. For IPv4, gateway IP address for assigned IP address.

Netmask

iSCSI only. For IPv4, subnet mask for assigned IP address.

Default Router

iSCSI only. For IPv6, default router for assigned IP address.

Link-Local Address

iSCSI only. For IPv6, the link-local address that is automatically generated from the MAC address and assigned to the port.

MAC

iSCSI only. Unique Media Access Control (MAC) hardware address, also called the physical address.

SFP Status

If the `detail` parameter is specified, this field shows the SFP status:

- `OK`
- `Not present`: No SFP is inserted in this port.
- `Not compatible`: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.
- `Incorrect protocol`: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.

Part Number

If the `detail` parameter is specified, this field shows the SFP part number.

Supported Speeds

FC only. If the `detail` parameter is specified, this field shows the link speeds that the SFP supports.

10G Compliance

iSCSI only. If the `detail` parameter is specified, this field shows the SFP's 10G compliance code, if supported.

Ethernet Compliance

iSCSI only. If the `detail` parameter is specified, this field shows the SFP's Ethernet compliance code, if supported.

Cable Technology

iSCSI only. If the `detail` parameter is specified, this field shows whether the SFP supports active or passive cable technology.

Cable Length

iSCSI only. If the `detail` parameter is specified, this field shows the link length (in meters) that is supported by the SFP while operating in compliance with applicable standards for the cable type.

Example Show information about host ports in each controller module.

```
# show ports
```

Show detailed information about host ports in each controller module.

```
# show ports detail
```

Basetypes

- [port](#)
- [status](#)

See also

- [set host-parameters](#)

show power-supplies

Description Shows information about each power supply in the storage system.

Min. role monitor

Syntax `show power-supplies`

Output `Encl`

The ID of the enclosure that contains the power supply.

`Serial Number`

The serial number of the power supply.

`Name`

The power supply identifier and location.

`Health`

- OK
- Degraded
- Fault
- N/A
- Unknown

`Reason`

If Health is not OK, this field shows the reason for the health state.

`Action`

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show information about each power supply in each enclosure.

```
# show power-supplies
```

Basetypes

- [unhealthy-component](#)
- [power-supplies](#)
- [fan](#)
- [status](#)

See also

- [show fans](#)
- [show frus](#)

show priorities

Description Shows snapshot-retention priorities for a specified snap pool. This command applies to linear storage only.

Snap-pool priorities, in conjunction with snapshot priorities, determine which snapshots are retained if system resource limitations require some snapshots to be automatically deleted.

Lower-priority snapshots will be deleted before higher-priority snapshots. Priority values are 0–65535.

Min. role monitor

Syntax `show priorities`
`snap-pool`

Parameters *snap-pool*

The name or serial number of the snap pool, as shown by the [show snap-pools](#) command.

Output Attribute Name

- Standard Snapshot
- Volume Copy Snapshot: A snapshot that is being used to copy data from a source volume to a destination volume. This attribute is temporary for the duration of the volume-copy process.
- Replication Snapshot
- Replicating Snapshot: A snapshot that is being replicated to a secondary volume. This snapshot is required in order to resume the replication. The attribute is temporary for the duration of the replication process.
- Common Sync Point Snapshot: The latest snapshot that is copy-complete on all secondary volumes. It identifies a common point in time that is known by all destinations.
- Only Sync Point Snapshot: The only sync point that is available on at least one secondary volume. If this snapshot is removed, then the next replication requires a full sync to be performed.
- Queued Snapshot: A snapshot that was taken for remote replication but is queued waiting for the previous replications to complete.
- DRM Snapshot: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).

Priority

Retention priority for the corresponding attribute. Values are shown as hexadecimal numbers.

Example Show priorities for snap-pool SP1.

```
# show priorities SP1
```

Basetypes

- [attribute-priorities](#)
- [status](#)

See also

- [set priorities](#)
- [show snap-pools](#)

show protocols

Description Shows which management services and protocols are enabled or disabled.

Min. role monitor

Syntax show protocols

Output Web Browser Interface (HTTP)

Shows whether the standard WBI web server is enabled or disabled. The default is Disabled.

Secure Web Browser Interface (HTTPS)

Shows whether the secure WBI web server is enabled or disabled. The default is Enabled.

Command Line Interface (Telnet)

Shows whether the standard CLI is enabled or disabled. The default is Enabled.

Secure Command Line Interface (SSH)

Shows whether the secure shell CLI is enabled or disabled. The default is Enabled.

Storage Management Initiative Specification (SMI-S)

Shows whether the secure SMI-S interface is enabled or disabled. When enabled, this option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5989. The default is Enabled.

Unsecure Storage Management Initiative Specification (SMI-S 5988)

Shows whether the secure SMI-S interface is enabled or disabled. When enabled, this option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988. The default is Disabled.

File Transfer Protocol (FTP)

Shows whether the expert interface for performing actions such as updating firmware is enabled or disabled. The default is Enabled.

Simple Network Management Protocol (SNMP)

Shows whether the SNMP interface is enabled or disabled. When this is disabled, all SNMP requests to the MIB are disabled and SNMP traps are disabled. The default is Enabled.

Service Debug

Shows whether the Telnet debug port is enabled or disabled. The default is Disabled.

In-band SES Management (SES)

Shows whether the in-band SES interface is enabled or disabled. The default is Enabled.

Activity Progress Reporting (activity)

Shows whether access to the activity progress interface via HTTP port 8081 is enabled or disabled. This mechanism reports whether a firmware update or partner firmware update operation is active and shows the progress through each step of the operation. In addition, when the update operation completes, status is presented indicating either the successful completion, or an error indication if the operation failed. This is disabled by default.

Management Mode

Shows the default management mode, which controls the terminology used in command output and system messages. This setting does not affect access to commands.

- v2: Uses terminology that is oriented to managing linear storage. For example, *vdisk* for disk groups and pools.
- v3: Uses terminology that is oriented to managing virtual and linear storage. For example, *disk group* for disk groups and *pool* for pools.

To see the management mode for the current CLI session, which can be set differently than the default, use the `show cli-parameters` command.

Example Show the status of service and security protocols.

```
# show protocols
```

Basetypes • [security-communications-protocols](#)
• [status](#)

See also • [set protocols](#)
• [show cli-parameters](#)

show provisioning

Description Shows information about how the system is provisioned. This command shows the associations between controllers, disks, vdisks or pools, volumes, and mappings. The command will show information for all associations by default, or you can use parameters to filter the output.

This command is useful for the following purposes:

- You want a quick overview of how the system is provisioned.
- You know of a disk-related issue (perhaps from the event log) and want to understand what components it may be impacting. You can use this command to see which volume WWNs are affected, which you can use on the host to determine which device node might be seeing errors.
- You know of a volume-level issue and want to determine which associated components to investigate. You can use this command to quickly see which controller owns the volume and which disks are associated with the volume. For example, perhaps at the OS level, a certain device node (target) looks “slow” relative to the rest of the targets. You can correlate the OS device node to the volume WWN (or LUN), and then use the command output to find the associated controller and disks.

Min. role monitor

Syntax `show provisioning`
`[disks disks | luns LUNs | pool pools | ports ports | vdisks vdisks | volumes volumes]`
`[no-mapping]`
`[unhealthy]`

Parameters `disks disks`

Optional. Shows provisioning information for the specified list of disks. For disk syntax, see "[Command syntax](#)" (page 23). This command does not support the use of hyphens to indicate a range of disks.

`luns LUNs`

Optional. Shows provisioning information for the specified list of LUNs.

`no-mapping`

Optional. Shows the Mapped field but no other mapping information. If this parameter is omitted, all mapping information is shown.

`pool pools`

Optional. Shows provisioning information for the specified list of pools. A name that includes a space must be enclosed in double quotes.

`ports ports`

Optional. Shows provisioning information for the specified list of ports. For port syntax, see "[Command syntax](#)" (page 23). This command does not support the use of hyphens to indicate a range of ports.

`vdisks vdisks`

Optional. Shows provisioning information for the specified list of vdisks. A name that includes a space must be enclosed in double quotes.

`volumes volumes`

Optional. Shows provisioning information for the specified list of volumes. A name that includes a space must be enclosed in double quotes.

`unhealthy`

Optional. Shows provisioning information for vdisks or pools whose health is not OK. If this parameter is omitted, provisioning information is shown for all vdisks or pools.

Output Volume information:

Volume

- Volume name.
- Blank if the vdisk or pool does not have a volume.

WWN

- Volume World Wide Name.
- Blank if the vdisk or pool does not have a volume.

Ctlr

Owning controller of the vdisk or pool.

Disks

Shorthand list of the disks within a vdisk or pool.

Pool (v3)

Pool name.

Vdisk (v2)

Vdisk name.

Health

Health of the associated vdisk or pool:

- OK
- Degraded
- Fault
- N/A
- Unknown

Mapped

Indicates whether the volume is mapped. This is useful when the `no-mapping` parameter is specified to hide detailed mapping information.

- Yes: The volume is mapped.
- No: The volume is not mapped.

Mapping information:

Ports

- Controller host ports that the mapping applies to.
- Blank if not mapped or mapped as `no-access`.

LUN

- LUN that identifies the volume to a host.
- Blank if not mapped or mapped as `no-access`.

Access

Type of host access to the volume:

- `read-write`: The host has read and write access to the volume. This is the default.
- `read-only`: The host has read access to the volume.
- `no-access`: The host is denied access to the volume.
- `not-mapped`: The host is not mapped to the volume.

Host-Port-Identifier (v2)

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).
- all other initiators: The volume's default mapping.

Identifier (v3)

See `Host-Port-Identifier`, above.

Nickname

Host nickname, or blank if not set or for all other hosts

Example Show provisioning for the system.

```
# show provisioning
```

Show provisioning for vdisk myR1.

```
# show provisioning vdisks myR1
```

Show provisioning for all unhealthy vdisks.

```
# show provisioning unhealthy
```

Basetypes • provisioning

- [status](#)

See also • [show disk-groups](#)

- [show disks](#)
- [show maps](#)
- [show pools](#)
- [show vdisks](#)

show redundancy-mode

Description Shows the redundancy status of the system.

Min. role monitor

Syntax show redundancy-mode

Output Controller Redundancy Mode

Shows the system's operating mode, also called the cache redundancy mode:

- **Independent Cache Performance Mode:** For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- **Active-Active ULP:** Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- **Single Controller:** The enclosure contains a single controller.
- **Failed Over:** Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- **Down:** Both controllers are not operational.

Controller Redundancy Status

- **Redundant with independent cache:** Both controllers are operational but are not mirroring their cache metadata to each other.
- **Redundant:** Both controllers are operational.
- **Operational but not redundant:** In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.
- **Down:** This controller is not operational.
- **Unknown:** Status information is not available.

Controller ID Status

- **Operational:** The controller is operational.
- **Down:** The controller is installed but not operational.
- **Not Installed:** The controller is not installed.

Controller ID Serial Number

- **Controller module serial number**
- **Not Available:** The controller is down or not installed.

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- **Operational**
- **Not Operational**
- **Not Communicating**
- **Unknown**

Example Show the redundancy status of the system.

```
# show redundancy-mode
```

Basetypes

- [redundancy](#)
- [status](#)

show refresh-counters

Description In XML API format only, shows when the data represented by the basetype was last updated.

The value 0 means the data has never been updated and is not cached. A value other than 0 is a timestamp indicating that the data has been updated. If the value has changed since the last time you called this command then the data has changed.

Min. role monitor

Syntax show refresh-counters

Basetypes

- [refresh-counters](#)
- [status](#)

See also

- [set cli-parameters](#)

show remote-systems

Description Shows information about remote systems associated with the local system. This command applies to linear storage only.

Min. role monitor

Syntax `show remote-systems`
`[system]`

Parameters *system*
Optional. The name or network-port IP address of the remote system about which to show information.

Output `System Name`
The name of the remote system.

`System Contact`
The name of the person who administers the remote system.

`System Location`
The location of the remote system.

`System Information`
A brief description of the remote system.

`Vendor Name`
The vendor name of the remote system.

`Product ID`
The product model identifier of the remote system.

`Product Brand`
The brand name of the remote system.

`IP Address Controller A`
The IP address of the network port in controller A in the remote system.

`IP Address Controller B`
The IP address of the network port in controller B in the remote system.

`Username`
The name of a user with the `manage` role in the remote system.

`Status`

- `Uninitialized`: This system hasn't communicated with the remote system.
- `Ready`: This system has contacted the remote system and it is ready to use.
- `Connected`: This system is transferring data to the remote system.
- `Not Connected`: The system is not connected to the remote system.

`Last Connected`
Date and time, in the format `year-month-day hour:minutes:seconds (UTC)`, when successful communication was last established between the MC in the local system and the MC in the remote system. This value does not indicate when connection status was last determined, and will not be updated if the remote MC is not accessible or if the connection status is `Not Connected`.

Example Show information about remote system `System2`.

```
# show remote-systems System2
```

Basetypes

- `remote-system`
- `status`

- See also
- [create remote-system](#)
 - [delete remote-system](#)
 - [remote](#)
 - [set remote-system](#)

show replication-images

Description	<p>Shows information about replication images. This command applies to linear storage only.</p> <p>The command will show information for all replication images by default, or you can use parameters to filter the output.</p>
Min. role	monitor
Syntax	<pre>show replication-images [set replication-set] [replication-volume]</pre>
Parameters	<p><i>set replication-set</i> Optional. Specifies the name or serial number of a replication set for which to show image information. A name that includes a space must be enclosed in double quotes.</p> <p><i>replication-volume</i> Optional. Specifies the name or serial number of a replication volume for which to show image information. A name that includes a space must be enclosed in double quotes. If the name is not unique within the replication set, the local volume is assumed. If the name is not unique across replication sets, specify the <i>set</i> parameter.</p>
Output	<p>Replication volume summary information:</p> <p>Name The replication volume name.</p> <p>Serial Number The replication volume serial number.</p> <p>Type The replication volume type:</p> <ul style="list-style-type: none">• Primary Volume: The volume is the primary volume in a replication set.• Secondary Volume: The volume is the secondary volume in a replication set. <p>Replication volume image information:</p> <p>Image Serial Number The replication image serial number.</p> <p>Image Name The user-defined name assigned to the primary image.</p> <p>Snapshot Serial The replication snapshot serial number associated with the image. The replication snapshot is associated with the replication volume specified in the request.</p> <p>Snapshot Name The replication snapshot name associated with the image. For a secondary image, this value is not filled in until the replication is completed.</p> <p>Creation Date/Time The date and time when the replication image was created on the replication volume.</p>

Information shown for secondary images, not primary images:

Status

The status of the replication image:

- **N/A:** The image information is not valid.
- **Queued:** The image is known to exist in the primary-view volume but replication has not started.
- **Replicating:** The image is being replicated.
- **Suspended:** The image is being replicated but replication is suspended.
- **Complete:** The image is created, fully replicated, and available.
- **Create-Snapshot:** The image is fully replicated but a snapshot of the image is being created.
- **Offline:** The image has been replicated but is unusable due to an error.

Progress

The percentage complete if the image is being replicated. Applies only to secondary volumes.

Start Date/Time

The date and time when replication started on the replication volume.

Last Update

The date and time when the image was last updated (either due to an ongoing replication operation or the replication being completed).

Suspended

The date and time when the image was suspended or resumed.

Est Complete

The estimated time when replication is expected to complete.

Time [HH:MM:SS]

The total time of replication (in hours, minutes, and seconds) including any suspension time.

Example Show information about replication images for replication set `rsvol1`.

```
# show replication-images rsvol1
```

Basetypes

- [replication-volume-summary](#)
- [status](#)

See also

- [show replication-sets](#)
- [show replication-volumes](#)

show replication-sets

Description Shows information about replication sets in the local system. This command applies to linear storage only. You can view information about all replication sets or a specific replication set.

Min. role monitor

Syntax show replication-sets
[replication-set]

Parameters replication-set
Optional. The name or serial number of a replication set or volume for which to display replication-set-level information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all replication sets.

Output Replication set information:

Name

The replication set name.

Serial Number

The replication set serial number.

Replication volume information:

Name

The replication volume name.

Serial Number

The replication volume serial number.

Status

Replication volume status:

- **Initializing:** The initial (full) replication to the volume is in progress.
- **Online:** The volume is online and is consistent with the last replicated image.
- **Inconsistent:** The volume is online but is in an inconsistent state. A full replication is required to initialize it.
- **Replicating:** The volume is online and replication is in progress.
- **Replicate-delay:** The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.
- **Suspended:** The volume is online but the in-progress replication has been suspended.
- **Offline:** The volume cannot be accessed or is unusable due to an error.
- **Establishing proxy:** The volume is establishing a proxy connection to a remote volume. This will occur when a detached secondary volume is reattached and is re-establishing a connection with the primary system in preparation for replication.
- **Detached:** The volume is detached for removal.

Status-Reason

More information about the status value, or N/A for Online status.

Monitor

The replication volume monitoring status:

- **OK:** Communication to the remote volume is successfully occurring on the FC or iSCSI network.
- **Failed:** Communication to the remote volume has failed because of an FC or iSCSI network issue or because the remote volume has gone offline.

Location

The replication volume location: Local or Remote.

Primary-Volume

The primary volume name. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Serial

Primary volume serial number. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Status

Primary volume status: Online, Offline, Conflict, or N/A.

MaxQueue

The number of replication images to consider when determining the next image to replicate. Used only if the On Collision parameter is set to Oldest.

MaxRetryTime

The amount of time in seconds that the replication volume should retry a replication operation on any specific image when errors occur. Used only if the On Error parameter is set to Retry.

On Error

The error policy to invoke when errors occur during the replication process: Retry or Suspend.

Link Type

The type of ports used to link the primary and secondary volumes:

- FC: FC ports.
- iSCSI: iSCSI ports.

On Collision

The collision policy used to determine the next image to replicate when multiple replication images are queued: Newest or Oldest.

Monitor Interval

The interval in seconds at which the primary volume should query the secondary volume.

Priority

The priority of the replication process on the replication volume: Low, Medium, or High.

Connection Status

- Not Attempted: Communication has not been attempted to the remote volume.
- Online: The volumes in the replication set have a valid connection but communication is not currently active.
- Active: Communication is currently active to the remote volume.
- Offline: No connection is available to the remote system.

Connection Time

The date and time of the last communication with the remote volume, or N/A.

Remote link information:

Connected Ports

- For a remote primary or secondary volume, this field shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller. If no path is found, N/A is shown.
- For a local primary or secondary volume, this field shows N/A.

Remote Address

The address of each host port in the remote system through which the volume is accessible.

Example Show information about all replication sets.

```
# show replication-sets
```

Show information about replication set RS1.

```
# show replication-sets RS1
```

Basetypes • [replication-set](#)

- [status](#)

See also • [show replication-images](#)

- [show replication-volumes](#)

show replication-volumes

Description Shows information about volumes in replication sets. This command applies to linear storage only.

The command will show information for all replication volumes by default, or you can use parameters to filter the output.

Min. role monitor

Syntax `show replication-volumes`
`[set replication-set]`
`[replication-volume]`

Parameters `set replication-set`
Optional. Specifies the name or serial number of a replication set for which to show volume information. A name that includes a space must be enclosed in double quotes.

`replication-volume`
Optional. Specifies the name or serial number of a replication volume for which to show information. A name that includes a space must be enclosed in double quotes. If the name is not unique within the replication set, the local volume is assumed. If the name is not unique across replication sets, specify the `set` parameter.

Output Replication volume information:

Name

The replication volume name.

Serial Number

The replication volume serial number.

Status

The replication volume status:

- **Initializing:** The initial (full) replication to the volume is in progress.
- **Online:** The volume is online and is consistent with the last replicated image.
- **Inconsistent:** The volume is online but is in an inconsistent state. A full replication is required to initialize it.
- **Replicating:** The volume is online and replication is in progress.
- **Replicate-delay:** The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.
- **Suspended:** The volume is online but the in-progress replication has been suspended.
- **Offline:** The volume cannot be accessed and is unusable due to an error.
- **Establishing proxy:** The volume is establishing a proxy connection to a remote volume. This will occur when a detached secondary volume is reattached and is re-establishing a connection with the primary system in preparation for replication.
- **Detached:** The volume is detached for removal.

Status-Reason

More information about the status value, or N/A for **Online** status.

Monitor

The replication volume monitoring status:

- **OK:** Communication to the remote volume is successfully occurring on the iSCSI network.
- **Failed:** Communication to the remote volume has failed because of an iSCSI communication issue or because the remote volume has gone offline.

Location

The replication volume location: `Local` or `Remote`.

Primary-Volume

The primary volume name. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Serial

The primary volume serial number. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Status

The primary volume status: Online, Offline, Conflict, or N/A.

MaxQueue

The maximum number of replication images to consider when determining the next image to replicate. Used only if the On Collision parameter is set to Oldest. The default is 32.

MaxRetryTime

The maximum amount of time in seconds that the replication volume should retry a replication operation on any specific image when errors occur. Used only if the On Error parameter is set to Retry. The default is 1800.

On Error

The error policy to invoke when errors occur during the replication process:

- **Retry:** Retry the replication for the time specified by the MaxRetryTime value. This is the default.
- **Suspend:** Suspend the replication until the error is resolved automatically or through user intervention.

Link Type

The type of ports used to link the primary and secondary volumes:

- **FC:** FC ports.
- **iSCSI:** iSCSI ports.

On Collision

The collision policy used to determine the next image to replicate when multiple replication images are queued:

- **Newest:** Only the latest replication image should be considered for the next replication operation.
- **Oldest:** Only the latest *n* replication images should be considered for the next replication operation, where *n* is defined by the MaxQueue value and the oldest of these images should be considered first. This is the default.

Monitor Interval

The interval in seconds at which the primary volume should query the secondary volume. The default is 300.

Priority

The priority of the replication process on the replication volume:

- **High:** Replication has higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.
- **Medium:** Replication performance is balanced with host I/O performance.
- **Low:** Replication runs at a slower rate with minimal effect on host I/O. Use when streaming data without interruption is more important than data redundancy.

Connection Status

- **Not Attempted:** Communication has not been attempted to the remote volume.
- **Online:** The volumes in the replication set have a valid connection but communication is not currently active.
- **Active:** Communication is currently active to the remote volume.
- **Offline:** No connection is available to the remote system.

Connection Time

The date and time of the last communication with the remote volume, or N/A.

Remote link information:

Connected Ports

- For a remote primary or secondary volume, this field shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller. If no path is found, N/A is shown.
- For a local primary or secondary volume, this field shows N/A.

Remote Address

The address of each host port in the remote system through which the volume is accessible.

Example Show information about all replication volumes.

```
# show replication-volumes
```

Show information about replication volume MyData in replication set RS1.

```
# show replication-volumes set RS1 MyData
```

Basetypes

- [replication-volume](#)
- [status](#)

See also

- [set replication-volume-parameters](#)
- [show replication-sets](#)

show sas-link-health

Description Shows the condition of SAS expansion-port connections.

Min. role monitor

Syntax show sas-link-health

Output Encl

The enclosure ID.

Ctlr

The ID of the controller module or expansion module.

Name

- **Out Port:** Egress (expansion) port in a controller module or an expansion module. Can be connected to an ingress port in an expansion module.
- **In Port:** Ingress port in an expansion module. Can be connected to an egress (expansion) port in a controller module or an expansion module.

Status

- **Up:** The port is cabled and has an I/O link.
- **Warning:** Not all of the port's PHYs are up.
- **Error:** The port is reporting an error condition.
- **Not Present:** The controller module is not installed or is down.
- **Disconnected:** Either no I/O link is detected or the port is not cabled.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show the condition of SAS expansion-port connections in each enclosure.

```
# show sas-link-health
```

Basetypes

- [expander-ports](#)
- [status](#)

show schedule-details (Deprecated)

Use [show schedules](#).

show schedules

Description Shows information about all task schedules.

Syntax `show schedules`
`[schedule-name]`

`schedule-name`

Optional. Shows information about the specified schedule only. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all schedules.

Output `Schedule Name`
The schedule name.

`Schedule Specification`

The schedule settings for running the associated task.

`Status`

- `Uninitialized`: The task is not yet ready to run.
- `Ready`: The task is ready to run at the next scheduled time.
- `Suspended`: The task had an error and is holding in its current state.
- `Expired`: The task exceeded a constraint and will not run again.
- `Invalid`: The task is invalid.
- `Deleted`: The task has been deleted.

`Next Time`

The date and time, in the format *year-month-day hour:minutes:seconds* (UTC), when the schedule will next run.

`Task To Run`

The name of the task that the schedule runs.

`Error Message`

- If an error occurred while processing the task, the error message.
- Blank if no error occurred.

Task-specific information, as shown by the [show tasks](#) command.

Example Show information about all task schedules.

```
# show schedules
```

Show information about schedule Sched2.

```
# show schedules Sched2
```

Basetypes • [schedules](#)
• [status](#)

See also • [create schedule](#)
• [delete schedule](#)
• [set schedule](#)
• [show tasks](#)

show sensor-status

Description Shows the status of each environmental sensor in each enclosure.

Information shown only for a controller enclosure: on-board temperature, disk controller temperature, memory controller temperature, supercapacitor voltage and charge, overall unit (enclosure) status.

Information shown for all enclosures: temperature, voltage, and current for each IOM (controller module or expansion module); temperature, voltage, and current for each PSU (power supply).

Normal and error ranges for temperature and voltage are specified in the Setup Guide.

Min. role monitor

Syntax show sensor-status

Output Encl
The enclosure ID.

Drawer
The drawer ID.

Sensor Name
The sensor name and location.

Value

- For a sensor, its value.
- For Overall Unit Status, one of the status values below.

Status

- **OK:** The sensor is present and detects no error condition.
- **Warning:** The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds.
- **Error:** The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold.
- **Unavailable:** The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup.
- **Unrecoverable:** The enclosure management processor (EMP) cannot communicate with the sensor.
- **Unknown:** The sensor is present but status is not available.
- **Not Installed:** The sensor is not present.
- **Unsupported:** Status detection is not implemented.

Example Show the status of each environmental sensor in each enclosure.

```
# show sensor-status
```

Basetypes

- [sensors](#)
- [drawer-sensors](#)
- [status](#)

show shutdown-status

Description Shows whether each Storage Controller is active or shut down.

Min. role monitor

Syntax show shutdown-status

Output Controller A

- up (active)
- down (shut down or killed)
- not installed

Controller B

- up (active)
- down (shut down or killed)
- not installed

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- Operational
- Not Operational
- Not Communicating
- Unknown

Example Show the shutdown status of each controller.

```
# show shutdown-status
```

Basetypes

- [show-other-mc-status](#)
- [shutdown-status](#)
- [status](#)

See also

- [restart](#)
- [shutdown](#)

show snap-pools

Description Shows information about snap pools. This command applies to linear storage only.

The command will show information for all snap pools by default, or you can use parameters to filter the output.

NOTE: The process of freeing space associated with deleted snapshots occurs more slowly when the system is operating write-through cache mode than in write-back cache mode. Therefore, there will be a delay between deleting the snapshots and when their used space is shown as free space by the `show snap-pools` command.

Min. role monitor

Syntax `show snap-pools`
 `[controller a|b|both]`
 `[pool pool]`

Parameters `controller a|b|both`

Optional. Shows snap pools owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, all snap pools owned by either controller are shown.

`pool pool`

Optional. Specifies the name or serial number of the pool that contains the snap pools for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for snap pools in all pools.

Output `Vdisk`

The name of the vdisk that contains the snap pool.

`Pool`

The name of the storage pool that contains the snap pool.

`Serial Number`

The serial number of the snap pool.

`Name`

The name of the snap pool.

`Size`

Total size of the snap pool volume.

`Free (size)`

The amount of free space available in the snap pool.

`Master Volumes`

The number of master volumes associated with this snap pool.

`Snapshots`

The number of snapshots using this snap pool.

`Status`

- `Available`: The snap pool is available for use.
- `Offline`: The snap pool is not available for use, as in the case where its disks are not present.
- `Corrupt`: The snap pool's data integrity has been compromised. The snap pool can no longer be used.

Threshold

Snap pool threshold level:

- **Warning:** The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator. The default is 75%.
- **Error:** The snap pool is nearly full and unless corrective action is taken, snapshot data loss is probable. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered. The default is 90%.
- **Critical:** The snap pool is 98% full and data loss is imminent. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.

%Usage

Threshold value (percent of snap pool space used) that triggers the threshold's policy.

Policy

Recovery policy to invoke when threshold value is reached:

- **autoexpand:** Try to expand the snap pool by the `SizeToExpand` value. If the snap pool's space usage reaches the percentage specified by its error threshold, the system will log Warning event 230 and will try to expand the snap pool by the snap pool's `SizeToExpand` value (below).
 - If the snap pool is successfully expanded, the system will log Informational event 444.
 - If the snap pool cannot be expanded because there is not enough available space in its vdisk, the system will log Warning event 444 and will automatically delete the oldest snapshot that is not a current sync point.

Each time the snap-pool's error threshold is reached and the system cannot auto-expand the vdisk, the oldest remaining snapshot that is not a current sync point will be deleted. This behavior occurs for each snap pool independently, based on its space usage.

- **deleteoldestsnapshot:** Delete the oldest snapshot.
- **deletesnapshots:** Delete all snapshots.
- **haltwrites:** Halt writes to the snap pool.
- **notifyonly:** Generates an event to notify the administrator.

SizeToExpand

- *size:* For the `autoexpand` policy, the size by which to automatically expand the snap pool when the threshold is reached.
- *N/A:* The policy is not set to `autoexpand`.

Example Show information about all snap pools.

```
# show snap-pools
```

Show information snap pools owned by controller A.

```
# show snap-pools controller a
```

Basetypes

- [snap-pools](#)
- [status](#)

See also

- [create snap-pool](#)
- [delete snap-pool](#)
- [expand snap-pool](#)
- [set snap-pool-policy](#)
- [set snap-pool-threshold](#)

show snapshots

Description Shows information about snapshots. The command will show information for all snapshots by default, or you can use parameters to filter the output.

Min. role monitor

Syntax `show snapshots`
`[controller a|b|both]`
`[master-volume master-volume]`
`[pool pool]`
`[snap-pool snap-pool]`
`[type standard|replication|all]`
`[volume volume]`

Parameters `controller a|b|both`

Optional. Shows snapshots owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, snapshots owned by either controller are shown.

`master-volume master-volume`

Optional. Shows snapshots associated with the specified master volume name or serial number. A name that includes a space must be enclosed in double quotes.

`pool pool`

Optional. Specifies the name or serial number of the pool that contains the snapshots for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for snapshots in all pools.

`snap-pool snap-pool`

Optional. Shows snapshots associated with the specified snap pool name or serial number. A name that includes a space must be enclosed in double quotes.

`type standard|replication|all`

Optional. Shows only standard (non-replication) snapshots, only replication snapshots, or snapshots of all types. If this parameter is omitted, snapshots of all types are shown.

`volume volume`

Optional. Shows snapshots associated with the specified volume name or serial number. A name that includes a space must be enclosed in double quotes.

Output `Pool`

The name of the pool that contains the snapshot.

`Serial Number`

Snapshot serial number

`Name`

The name of the snapshot.

`Creation Date/Time`

The date and time when the snapshot was prepared or committed.

`Status`

- Available
- Unavailable: See the Status-Reason value.

Status-Reason

Shows N/A for Available status, or one of the following reasons for Unavailable status:

- snapshot not found
- snap pool not found
- master volume not found
- snapshot pending (not yet committed)
- snap pool not accessible
- master volume not accessible
- Volume copy with modified data is in progress
- Rollback with modified data is in progress
- Unknown reason

Parent Volume

The name of the volume of which the snapshot was taken.

Base Vol

The root of the snapshot tree, if any. A snapshot tree is a series of inter-related snapshots of a volume and can be 254 levels deep.

Snaps

The number of child snapshots (snapshots taken of this snapshot).

TreeSnaps

The number of snapshots taken of the base volume and its children. This count includes the base volume and all snapshots that share the base volume as their root.

Snap-Pool

- The name of the snap pool for linear snapshots.
- Blank for virtual snapshots.

Snap Data

The total amount of write data associated with the snapshot.

Unique Data

The amount of write data that is unique to the snapshot.

Shared Data

The amount of write data that is shared between this snapshot and other snapshots.

Example Show information about all snapshots.

```
# show snapshots
```

Show information about snapshots of volume v2.

```
# show snapshots volume v2
```

Basetypes • [snapshots](#)

- [status](#)

See also • [show master-volumes](#)

- [show pools](#)
- [show snap-pools](#)
- [show volumes](#)

show snmp-parameters

Description Shows SNMP settings for event notification.

Min. role monitor

Syntax show snmp-parameters

Output SNMP Trap Notification Level

- **crit:** Only Critical events are sent as traps.
- **error:** Error and Critical events are sent as traps.
- **warn:** Warning, Error, and Critical events are sent as traps.
- **info:** All events are sent as traps.
- **none:** No events are sent as traps and traps are disabled.

SNMP Trap Host IP#

The IP address of each trap host.

SNMP read community

The community string for read-only access. The value is obscured for users having only the `monitor` role and is shown in clear text for users having the `manage` role.

SNMP write community

The community string for write access. The value is obscured for users having only the `monitor` role and is shown in clear text for users having the `manage` role.

Example Show SNMP notification settings.

```
# show snmp-parameters
```

Basetypes

- [snmp-parameters](#)
- [status](#)

See also

- [set snmp-parameters](#)
- [set protocols](#)
- [show protocols](#)

show syslog-parameters

Description Shows syslog notification parameters for events and managed logs.

Min. role monitor

Syntax `show syslog-parameters`

Output Syslog Host IP

The IP address of the remote syslog server to use for the notifications.

Syslog Notification Level

Shows the minimum severity for which the system sends notifications:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables syslog notification and clears the settings.

Syslog Host Port

The port on which the remote syslog facility is expected to listen for notifications.

Example Show settings for remote syslog notification.

```
# show syslog-parameters
```

Basetypes • [syslog-parameters](#)

See also • [set syslog-parameters](#)

show system

Description Shows information about the storage system. If the system's health is not OK, each unhealthy component is listed with information to help you resolve the health problem.

Min. role monitor

Syntax show system
[detail]

Parameters detail

Optional. Shows the SCSI Vendor ID and SCSI Product ID fields on a system where they are hidden by default.

Output System Name

The name of the system. The default is Uninitialized Name.

System Contact

The name of the person who administers the system. The default is Uninitialized Contact.

System Location

The location of the system. The default is Uninitialized Location.

System Information

A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.

Midplane Serial Number

The serial number of the controller enclosure midplane.

Vendor Name

The vendor name.

Product ID

The product model identifier.

Product Brand

The product brand name.

SCSI Vendor ID

The vendor name returned by the SCSI INQUIRY command.

SCSI Product ID

The product identifier returned by the SCSI INQUIRY command.

Enclosure Count

The number of enclosures in the system.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

If Health is not OK, this field shows the reason for the health state.

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- Operational
- Not Operational
- Not Communicating
- Unknown

PFU Status

Shows whether partner firmware update is running on the system, or is idle.

Supported Locales

Supported display languages: English, Spanish, French, German, Italian, Japanese, Dutch, Chinese-Simplified, Chinese-Traditional, Korean.

Example Show information about the system.

```
# show system
```

Basetypes

- [system](#)
- [unhealthy-component](#)
- [status](#)

See also

- [set system](#)
- [show system-parameters](#)

show system-parameters

Description Shows certain storage-system settings and configuration limits. For a summary of the physical and logical limits of the storage system, see the system configuration limits topic in the WBI help.

Min. role monitor

Syntax show system-parameters

Output ULP Enabled

Shows that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers. The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can choose any available path to access a LUN regardless of vdisk ownership. When ULP is in use, the system's operating/cache-redundancy mode is shown as Active-Active ULP. ULP uses the T10 Technical Committee of INCITS Asymmetric Logical Unit Access (ALUA) extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.

Number of Host Ports

The number of host-interface ports in the controller enclosure.

Maximum Disks

The number of disks that the system supports.

Maximum Volumes

The number of volumes that the system supports.

Maximum Linear Disk Groups (v3)

The number of linear disk groups that the system supports.

Maximum Linear Vdisks (v2)

The number of vdisks that the system supports.

Maximum LUNs

The number of LUNs that the system supports.

Maximum Linear Disk Groups per Controller (v3)

The number of linear disk groups that each controller supports.

Maximum Linear Vdisks per Controller (v2)

The number of vdisks that each controller supports.

Maximum Virtual Pools per Controller

The number of virtual pools that each controller supports.

Maximum Virtual Disk Groups per Pool

The number of virtual pools that each pool can contain.

Maximum Host Groups

The number of host groups that the system supports.

Maximum Hosts per Host Group

The maximum number of hosts that a host group can contain.

Maximum Initiators per Host

The maximum number of initiators that a host can contain.

Maximum Volume Groups per Controller

The maximum number of volume groups that each controller supports.

Maximum Volumes per Volume Group

The maximum number of volumes that a volume group can contain.

Local Controller

The ID of the controller you are accessing.

Serial Number

The last six digits of the midplane serial number.

Example Show settings and configuration limits for the storage system.

```
# show system-parameters
```

Basetypes • [system-parameters-table](#)
• [status](#)

See also • [show system](#)

show task-details (Deprecated)

Use [show tasks](#).

show tasks

Description Shows information about tasks.

Syntax `show tasks`
`[task-name]`

task-name

Optional. Shows information about the specified task only. If this parameter is omitted, information is shown for all tasks.

Output For a TakeSnapshot task:

Task Name

The name of the task.

Task Type

TakeSnapshot

Status

- **Uninitialized:** The task is not yet ready to run.
- **Ready:** The task is ready to run.
- **Active:** The task is running.
- **Error:** The task has an error.
- **Invalid:** The task is invalid.
- **Complete:** The task is complete.
- **Deleted:** The task has been deleted.

Task State

The current step of the task:

- Start
- VerifyVolume
- ValidateLicensingLimit
- CreateName
- CreateSnap
- VerifySnap
- InspectRetention
- FindOldestSnap
- UnmapSnap
- ResetSnap
- RenameSnap

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Source Volume

The name of the master volume.

Source Volume Serial

The serial number of the master volume.

Prefix

The label that identifies snapshots created by this task.

Count

The number of snapshots to retain with this prefix. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.

Last Created

- The name of the last snapshot created by the task.
- Blank if the task has not taken a snapshot.

Snapshot Name

- The name of each snapshot taken.
- Blank if the task has not taken a snapshot.

Snapshot Serial

- The serial number of each snapshot taken.
- Blank if the task has not taken a snapshot.

For a ResetSnapshot task:

Task Name

The name of the task.

Task Type

ResetSnapshot

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State

The current step of the task:

- Start
- VerifySnap
- UnmapSnap
- ResetSnap

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Snapshot Name

The name of the snapshot to reset.

Snapshot Serial Number

The serial number of the snapshot to reset.

For a VolumeCopy task:

Task Name

The name of the task.

Task Type

VolumeCopy

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State

The current step of the task:

- Start
- VerifyVolume
- CreateName
- ObtainMap
- UnmapVolume
- CreateVolume
- RemapVolume
- VerifyCreatedVolume

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Source Volume

The name of the volume to be copied.

Source Volume Serial

The serial number of the volume to be copied.

Destination Vdisk

The name of the vdisk in which the new volume will be created.

Destination Pool

The name of the pool in which the new volume will be created.

Destination Vdisk Serial

The serial number of the destination vdisk.

Destination Pool Serial

The serial number of the destination pool.

Prefix

The label that identifies copies created by this task.

Modified Data

- modified: The copy includes modified snapshot data.
- preserved: The copy excludes modified snapshot data.

Last Created

- The name of the last volume created by the task.
- Blank if the task has not taken a volume.

For a ReplicateVolume task:

Task Name

The name of the task.

Task Type

ReplicateVolume

Status

- **Uninitialized:** The task is not yet ready to run.
- **Ready:** The task is ready to run.
- **Active:** The task is running.
- **Error:** The task has an error.
- **Invalid:** The task is invalid.
- **Complete:** The task is complete.
- **Deleted:** The task has been deleted.

Task State

The current step of the task:

- Start
- VerifyVolume
- CreateName
- RepVolume
- VerifySnap

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Primary Volume Name

The name of the volume to replicate.

Primary Volume Serial Number

The serial number of the volume to replicate.

Prefix

The label that identifies snapshots created by this task.

Mode

- **new-snapshot:** Replicate a new snapshot of the primary volume.
- **last-snapshot:** Replicate the most recent existing snapshot of the primary volume.

Last Created

- The name of the last snapshot created by the task.
- Blank if the task has not created a snapshot.

Last Used Snapshot

For a task whose replication mode is `last-snapshot`, the name of the last snapshot used for replication. Otherwise, N/A.

For an EnableDSD task:

Task Name

The name of the task.

Task Type

EnableDSD

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State

The current step of the task, which is always Start .

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

For a DisableDSD task:

Task Name

The name of the task.

Task Type

DisableDSD

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State

The current step of the task, which is always Start .

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Example Show information about all tasks.

```
# show tasks
```

Show information about task Task1.

```
# show tasks Task1
```

Basetypes

- [tasks](#)
- [status](#)

- See also
- [create schedule](#)
 - [create task](#)
 - [delete task](#)
 - [set task](#)
 - [show schedules](#)

show tiers

Description Shows information about tiers.

Min. role monitor

Syntax `show tiers`
`tier performance|standard|archive|readcache|all`

Parameters `tier performance|standard|archive|readcache|all`
Specifies the tier for which to show information.

Output

`Pool`
The name of the pool.

`Tier`
The name of the tier.

`% of Pool`
The percentage of pool capacity that the tier occupies.

`Disks`
The number of disks in the tier.

`Total Size`
The total capacity of the tier.

`Alloc Size`
The amount of space currently allocated to volumes in the tier.

`Available Size`
The available capacity in the tier.

Example Show information about all tiers.

```
# show tiers tier all
```

Show information about the Standard tier.

```
# show tiers tier standard
```

Basetypes

- [tiers](#)
- [status](#)

See also

- [show tier-statistics](#)

show tier-statistics

Description Shows live performance statistics for tiers. The command will show information for all tiers by default, or you can use parameters to filter the output. For tier performance statistics, the system samples live data every 30 seconds.

Properties shown only in XML API format are described in "[XML API basetype properties](#)" (page 376).

Min. role monitor

Syntax `show tier-statistics`
`[pool pool]`
`tier performance|standard|archive|readcache|all`

Parameters `pool pool`

Optional. Specifies the name or serial number of the pool for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all pools.

`tier performance|standard|archive|readcache|all`
Specifies the tier for which to show statistics.

Output `Pool`

The name of the pool.

`Tier`

The name of the tier.

`Pages Allocated per Min`

The rate, in pages per minute, at which pages are allocated to volumes in the tier because they need more space to store data.

`Pages Deallocated per Min`

The rate, in pages per minute, at which pages are deallocated from volumes in the tier because they no longer need the space to store data.

`Pages Reclaimed`

The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).

`Pages Unmapped per Minute`

The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI unmap command, to free storage space as a result of deleting files or formatting volumes on the host.

`Time (ms) Since Reset`

The amount of time, in milliseconds, since these statistics were last reset, either by a user or by a controller restart.

`Reads`

The number of read operations since these statistics were last reset or since the controller was restarted.

`Writes`

The number of write operations since these statistics were last reset or since the controller was restarted.

`Data Read`

The amount of data read since these statistics were last reset or since the controller was restarted.

`Data Written`

The amount of data written since these statistics were last reset or since the controller was restarted.

`Bytes per second`

The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Example Show statistics for all tiers.

```
# show tier-statistics tier all
```

Show statistics for the Standard tier in pool A.

```
# show tier-statistics pool A tier standard
```

Basetypes • [tier-statistics](#)

- [status](#)

See also • [reset all-statistics](#)

- [show pools](#)
- [show tiers](#)

show unwritable-cache

Description Shows the percentage of unwritable data in the system. This data has not been written to disk because it is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume's disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host and disk.

Min. role monitor

Syntax `show unwritable-cache`

Output Percent of unwritable cache in controller ID
The percentage of cache space occupied by unwritable data in the indicated controller module.

Example Show the percentage of unwritable cache data in each controller.

```
# show unwritable-cache
```

Basetypes • [unwritable-cache](#)

See also • [clear cache](#)

show users

Description Shows configured user accounts.

Min. role `monitor`

Syntax `show users`
 `[show-snmp-password]`
 `[user]`

Parameters `show-snmp-password`

Optional. Minimum role: `manage`. For SNMPv3 users, this parameter shows `Password` and `Privacy Password` values in clear text for reference when configuring users in the corresponding management application. If this parameter is omitted, password values are displayed obscured for security reasons.

`user`

Optional. Shows settings for the specified user only. If this parameter is omitted, settings are shown for all users.

Output Username

The user name.

Roles

- `monitor`: The user can view but not change system settings.
- `manage`: The user can view and change system settings.
- `admin`: The user can view and change system settings.
- `diagnostic`: The user can view and change system settings.

User Type

The user's experience level: `Novice`, `Standard`, `Advanced`, or `Diagnostic`. This parameter does not affect access to commands.

User Locale

The display language for this user. The default is English.

WBI

- `x`: The user can access the web-browser interface. This is the default.
- (blank): The user cannot access this interface.

CLI

- `x`: The user can access the command-line interface. This is the default.
- (blank): The user cannot access this interface.

FTP

- `x`: The user can access the FTP interface.
- (blank): The user cannot access this interface. This is the default.

SMI-S

- `x`: The user can access the Storage Management Initiative Specification (SMI-S) interface.
- (blank): The user cannot access this interface. This is the default.

SNMP

- `U`: The user can access the SNMPv3 interface and view the MIB.
- `T`: The user can access the SNMPv3 interface and receive trap notifications.
- (blank): The user cannot access this interface.

Authentication Type

- MD5: MD5 authentication. This is the default.
- SHA: SHA (Secure Hash Algorithm) authentication.
- none: No authentication.

Privacy Type

- DES: Data Encryption Standard.
- AES: Advanced Encryption Standard.
- none: No encryption. This is the default.

Password

The user password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password.

Privacy Password

The encryption password for an SNMPv3 user whose privacy type is set to DES or AES.

Trap Host Address

SNMP trap destination for an SNMPv3 user that can receive trap notifications.

Example Show information about all users.

```
# show users
```

Show information about user JSmith.

```
# show users JSmith
```

As a user with the manage role, show information—including SNMP passwords—for SNMPv3 user Traps.

```
# show users Traps show-snmp-password
```

Basetypes • [users](#)

- [status](#)

See also • [create user](#)

- [delete user](#)
- [set user](#)

show vdisks

Description Shows information about all or specified vdisks.

Min. role monitor

Syntax `show vdisks`
`[vdisks]`

Parameters `vdisks`

Optional. A comma-separated list of the names or serial numbers of the vdisks to show information about. A name that includes a space must be enclosed in double quotes.

Output Name

The vdisk name.

Size

The vdisk size.

Free

The amount of free (available) space in the vdisk.

Own

Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.

Pref

The controller that owns the vdisk and its volumes during normal operation.

RAID

The vdisk RAID level.

Class

- `Linear`: The vdisk acts as a linear pool.
- `Virtual`: The disk group is in a virtual pool.

Disks

The number of disks in the vdisk.

Spr

The number of spares assigned to the vdisk.

Chk

- For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk.
- For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).
- For RAID 50, the vdisk chunk size calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For a vdisk configured to use 32-KB chunk size and 4-disk subvdisks, the value would be 96k (32KB x 3).

Status

- **CRIT:** Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.
- **DMGD:** Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.
- **FTDN:** Fault tolerant with a down disk. The vdisk is online and fault tolerant, but some of its disks are down.
- **FTOL:** Fault tolerant and online.
- **MSNG:** Missing. The disk group is online and fault tolerant, but some of its disks are missing.
- **OFFL:** Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost.
- **QTCR:** Quarantined critical. The vdisk is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 vdisk or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined.
- **QTDN:** Quarantined with a down disk. The RAID-6 vdisk has one inaccessible disk. The vdisk is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined.
- **QTOF:** Quarantined offline. The vdisk is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 vdisk.
- **STOP:** The vdisk is stopped.
- **UNKN:** Unknown.
- **UP:** Up. The vdisk is online and does not have fault-tolerant attributes.

Jobs

Shows whether a job is running and its percent complete.

- **CPYBK:** The vdisk is being used in a copyback operation.
- **DRSC:** A disk is being scrubbed.
- **EXPD:** The vdisk is being expanded.
- **INIT:** The vdisk is initializing.
- **RCON:** The vdisk is being reconstructed.
- **VDRAIN:** The virtual disk group is being removed and its data is being drained to another disk group.
- **VPREP:** The virtual disk group is being prepared for use in a virtual pool.
- **VRECV:** The virtual disk group is being recovered to restore its membership in the virtual pool.
- **VREMV:** The disk group and its data are being removed.
- **VERFY:** The vdisk is being verified.
- **VRSC:** The vdisk is being scrubbed.
- Blank if no job is running.

Job%

- **0%-99%:** Percent complete of running job
- Blank if no job is running (job has completed)

Serial Number

The vdisk serial number.

Spin Down

- **Disabled:** DSD is disabled for the vdisk. This is the default.
- **Enabled - all spinning:** DSD is enabled for the vdisk.
- **Partial spin-down:** DSD is enabled for the vdisk and its disks are partially spun down to conserve power.
- **Full spin-down:** DSD is enabled for the vdisk and its disks are fully spun down to conserve power.

SD Delay

The period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show information about all vdisks.

```
# show vdisks
```

Show information about vdisk vd0002.

```
# show vdisks vd0002
```

Basetypes

- [virtual-disks](#)
- [status](#)

See also

- [create vdisk](#)
- [delete vdisks](#)
- [expand vdisk](#)
- [set vdisk](#)

show vdisk-statistics

Description Shows live or historical performance statistics for vdisks. This command applies to linear storage only.

You can view live statistics for all or specified vdisks, or historical statistics for a specified vdisk. The system samples disk-performance statistics every quarter hour and retains performance data for 6 months.

The `historical` option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters. If both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

For each vdisk these statistics quantify destages, read-aheads, and host reads that are cache misses. For example, each time data is written from a volume's cache to disks in the vdisk that contains the volume, the vdisk's statistics are adjusted.

Properties shown only in XML API format are described in "[XML API basetype properties](#)" (page 376).

NOTE: Values for the amount of data transferred and for data throughput appear to be much higher in historical output than in live output. This is caused by a difference in the way that historical and live values are calculated.

Live values are calculated based on the vdisk as viewed from the controller cache perspective. In the live statistics, performance numbers are obtained by accounting for when data is written from cache to disk or is read from disk to cache.

Historical data is obtained by using the summation of the disk statistics for the disks in the vdisk. The historical vdisk data shows transfers to and from the disks in the vdisk that include the overhead of any RAID transfers as well as any host activity.

Because I/Os from the RAID engine are included, values for the historical data appear higher than the numbers for the live data.

Min. role monitor

Syntax To show live statistics:

```
show vdisk-statistics
    [vdisks]
```

To show historical statistics:

```
show vdisk-statistics
    [all]
    [count number-of-data-samples]
    historical
    [time-range "date/time-range"]
    vdisk
```

Parameters all

Optional. Specifies to show the full set of performance metrics. If this parameter is omitted, the default set of performance metrics will be shown.

```
count number-of-data-samples
```

Optional. Specifies the number of data samples to display, from 1 to 100. Each sample will be shown as a separate row in the command output. If this parameter is omitted, 100 samples will be shown. If you specify this parameter, do not specify the `time-range` parameter.

```
historical
```

Optional. Specifies to show historical statistics. If this parameter is omitted, live statistics will be shown.

`time-range "date/time-range"`

Optional. Specifies the date/time range of historical statistics to show, in the format "`start yyyy-mm-dd hh:mm [AM|PM] end yyyy-mm-dd hh:mm [AM|PM]`". If the start date/time is specified but no end date/time is specified, the current date/time will be used as the end date/time. The system will return the oldest sample taken after the start time and the latest sample taken before the end time. If the specified start date/time is earlier than the oldest sample, that sample will be used as the start date/time. If you specify this parameter, do not specify the `count` parameter. If this parameter is omitted, the most recent 100 data samples will be displayed.

`vdisk`

Specifies the name or serial number of one vdisk for which to show historical statistics. A name that includes a space must be enclosed in double quotes.

`vdisks`

Optional. Specifies a comma-separated list of the names or serial number of vdisks for which to show live statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics will be shown for all vdisks.

Output Live

Name

The vdisk name.

Serial Number

The vdisk serial number.

Bytes per second

The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

Amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

I/O Resp Time

The average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.

Read Resp Time

The average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.

Write Resp Time

The average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.

Reset Time

The date and time, in the format `year-month-day hour:minutes:seconds`, when these statistics were last reset, either by a user or by a controller restart.

Output Historical

Name

The vdisk name.

Serial Number

The vdisk serial number.

Data Transferred

The total amount of data read and written since the last sampling time.

Total B/s

The data transfer rate, in bytes per second, for read and write operations since the last sampling time.

Sample Time

The date and time, in the format *year-month-day hour:minutes:seconds*, when the data sample was taken.

Output **Historical, All**

Name

The vdisk name.

Serial Number

The vdisk serial number.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the `all` parameter. The amount of data read since the last sampling time.

Data Written

Shown by the `all` parameter. The amount of data written since the last sampling time.

Total B/s

The data transfer rate, in bytes per second, since the last sampling time. This is the sum of `Read B/s` and `Write B/s`.

Read B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for write operations since the last sampling time.

Sample Time

The date and time, in the format *year-month-day hour:minutes:seconds*, when the data sample was taken.

Example Show live statistics for vdisks `VD1` and `MyVdisk`.

```
# show vdisk-statistics VD1,MyVdisk
```

Show historical statistics from a specified date and time range for vdisk `VD2`.

```
# show vdisk-statistics VD2 historical time-range "start 2013-01-18 4:40 PM
end 2013-01-18 5:00 PM"
```

Show all historical statistics (the latest 100 samples) for vdisk `VD2`.

```
# show vdisk-statistics VD2 historical all
```

- Basetypes**
- [vdisk-statistics](#) (live)
 - [virtual-disk-summary](#) (historical)
 - [vdisk-hist-statistics](#) (historical)
 - [status](#)

- See also
- [reset all-statistics](#)
 - [reset vdisk-statistics](#)
 - [show vdisks](#)

show versions

Description Shows firmware and hardware version information for each controller module.

Min. role monitor

Syntax show versions
[detail]

Parameters detail

Optional. Shows information about the versions of firmware and hardware in each controller module. If this parameter is omitted, only firmware-bundle information is shown.

Example Show firmware-bundle version information for the system.

```
# show versions
```

Show detailed version information for each controller module.

```
# show versions detail
```

Basetypes • [versions](#)

• [status](#)

See also • [show inquiry](#)

show volumecopy-status

Description Shows information about in-progress volume copy operations. This command applies to linear storage only. While a volume copy is in progress, the destination volume cannot be accessed.

Min. role monitor

Syntax show volumecopy-status
[controller a|b|both]

Parameters controller a|b|both
Optional. Shows volume copy operations for volumes owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, all volume copy operations are shown.

Output VC Volume Name
The name of the destination volume.

Serial Number
The serial number of the destination volume.

Vdisk
The name of the destination vdisk.

Source Volume
The name or serial number of the source volume.

Progress
The percent complete of the volume copy.

Status

- VC Online: A volume copy is in progress to the destination volume.
- VC Offline: The source volume went offline while a volume copy was in progress. When the source volume comes back online, the copy process resumes from the point where it stopped.
- Unknown: Status is unknown.

Status-Reason

More information about the Status value.

Example Show information about volume copies in progress for controller A.

```
# show volumecopy-status controller a
```

Basetypes

- [volume-copy-status](#)
- [status](#)

See also

- [abort volumecopy](#)
- [volumecopy](#)

show volume-groups

Description Shows information about specified volume groups or all volume groups

Min. role monitor

Syntax `show volume-groups`
`[volume-groups]`

Parameters `volume-groups`

Optional. A comma-separated list of the names of volume groups for which to show information. If this parameter is omitted, information is shown for all volume groups.

Output Volume group information:

Group Name

The name of the volume group.

Serial Number

The serial number of the volume group.

Type

The group type, which is Volume.

Number of Members

The number of volumes in the volume group.

Volume information:

Pool

The name of the pool that contains the volume.

Name

The name of the volume.

Total Size

The total size of the volume.

Alloc Size

The amount of space currently allocated to a virtual volume, or the total size of a linear volume.

Class

• `Virtual`: The volume is in a virtual pool.

Type

• `base`: Base volume

• `standard`: Standard volume

• `standard*`: Destination of an in-progress volume copy and cannot be mounted/ presented/mapped until the copy is complete

• `snap-pool`: Snap-pool volume

• `master volume`: Master volume

• `snapshot`: Snapshot volume

• `replication source`: Source for an in-progress replication to a secondary volume

Health

• `OK`

• `Degraded`

• `Fault`

• `N/A`

• `Unknown`

Reason

If `Health` is not OK, this field shows the reason for the health state.

Action

If `Health` is not OK, this field shows recommended actions to take to resolve the health issue.

Example Show information about all volume groups.

```
# show volume-groups
```

Show information about volume groups `VGroup1` and `VGroup2`.

```
# show volume-groups VGroup1,VGroup2
```

Basetypes • [volume-groups](#)

- [volumes](#)

- [status](#)

See also • [create volume-group](#)

- [delete volume-groups](#)

- [set volume-group](#)

show volume-maps (Deprecated)

Use [show maps](#).

show volume-names

Description Shows volume names and serial numbers. This reduced form of the [show volumes](#) command is optimized for seeking basic volume information from a remote system.

Min. role monitor

Syntax `show volume-names`
`[volumes]`

Parameters *volumes*
Optional. A comma-separated list of the names or serial numbers of the volumes for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all volumes.

Output **Name**
The name of the volume.

Serial Number
The serial number of the volume.

Example Show volume names and serial numbers.

```
# show volume-names
```

Basetypes

- [volume-names](#)
- [status](#)

See also

- [show maps](#)
- [show volumes](#)

show volume-reservations

Description Shows persistent reservations for all or specified volumes. The persistent group reservations (PGR) mechanism enables application clients on multiple hosts to control access to a storage volume, and limits access by other hosts.

Each host must be registered with the storage system in order to establish a persistent reservation for a volume, thereby becoming a reservation holder.

If the system gets into an abnormal state and you need to remove all registrations and reservations for specified volumes to return them to a “clean” state, you can use the `release volume` command. This command must be used with care, as described in its help.

For more information about persistent reservations, see the SPC-3 specification at <http://www.t10.org>.

Min. role monitor

Syntax `show volume-reservations`
`all | volumes`

Parameters `all | volumes`
Specifies all volumes, or a comma-separated list of the names or serial numbers of specific volumes. A name that includes a space must be enclosed in double quotes

Output **Name**
The name of the volume.

Serial Number
The serial number of the volume.

Volume Reserved

- **Free:** The volume is not reserved.
- **Reserved:** The volume has been reserved by a host.

Host ID
The host WWPN or iSCSI node name.

Port
The controller host-port identifiers.

Reservation Type

- **Write Exclusive:** Write commands are only allowed for a single reservation holder.
- **Exclusive Access:** Certain access (read, write) commands are only allowed for a single reservation holder.
- **Write Exclusive - Registrants Only:** Write commands are only allowed for registered hosts. There is a single reservation holder.
- **Exclusive Access - Registrants Only:** Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.
- **Write Exclusive - All Registrants:** Write commands are only allowed for registered hosts. There is a single reservation holder.
- **Exclusive Access - All Registrants:** Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.
- **Undefined:** The volume has no persistent reservations.

Example Show reservations for all volumes.

```
# show volume-reservations all
```

Show reservations for volume v2.

```
# show volume-reservations v2
```

- Basetypes
- [volume-reservations](#)
 - [status](#)
- See also
- [release volume](#)
 - [show volumes](#)

show volumes

Description Shows information about volumes. The command will show information for all volumes by default, or you can use parameters to filter the output.

Min. role monitor

Syntax `show volumes`
`[details]`
`[pool pool]`
`[type all|base|snap-pool|mastervolume|snapshot|standard|primary-volume|secondary-volume|replication-volume]`
`[vdisk vdisks]`
`[volumes]`

Parameters `details`

Optional. Shows additional information about the volumes.

`pool pool`

Optional. The name or serial number of the pool that contains the volumes for which to show information. A name that includes a space must be enclosed in double quotes.

`type all|base|snap-pool|mastervolume|snapshot|standard|primary-volume|secondary-volume|replication-volume`

Optional.

- `all`: Show all volume types.
- `base`: Show only virtual volumes that are not snapshots of any other volume.
- `snap-pool`: Show only snap pools.
- `mastervolume`: Show only master volumes.
- `snapshot`: Show only snapshots.
- `standard`: Show only standard volumes.
- `primary-volume`: Show only primary volumes.
- `secondary-volume`: Show only secondary volumes.
- `replication-volume`: Show only primary volumes and secondary volumes.

If this parameter is omitted, all volume types are shown.

`vdisk vdisks`

Optional. A comma-separated list of the names or serial numbers of the vdisks containing the volumes to show. A name that includes a space must be enclosed in double quotes.

`volumes`

Optional. A comma-separated list of the names or serial numbers of volumes for which to show information. A name that includes a space must be enclosed in double quotes.

Output Properties are described in alphabetical order.

Action

If **Health** is not OK, this field shows recommended actions to take to resolve the health issue.

Alloc Size

The amount of space currently allocated to a virtual volume, or the total size of a linear volume.

Cache Opt

Shown by the `details` parameter. The cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

Class

- `Linear`: The volume is in a linear pool.
- `Virtual`: The volume is in a virtual pool.

Desc

Shown by the `details` parameter.

- Blank if not set.

Health

- `OK`
- `Degraded`
- `Fault`
- `N/A`
- `Unknown`

Name

The name of the volume.

Pool

The name of the pool that contains the volume.

Read Ahead

Shown by the `details` parameter. The read-ahead cache setting:

- `Disabled`: Read-ahead is disabled.
- `Adaptive`: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.
- `Stripe`: Read-ahead is set to one stripe. The controllers treat non-RAID and RAID-1 vdisks internally as if they have a stripe size of 512 KB, even though they are not striped.
- `512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB`: Size selected by a user.

Reason

If `Health` is not `OK`, this field shows the reason for the health state.

Serial Number

Shown by the `details` parameter. The serial number of the volume.

Snap-Pool

Shown by the `details` parameter. The name of the snap pool.

Total Size

The total size of the volume.

Type

- `base`: Base volume
- `standard`: Standard volume
- `standard*`: Destination of an in-progress volume copy and cannot be mounted/presented/mapped until the copy is complete
- `snap-pool`: Snap-pool volume
- `master volume`: Master volume
- `snapshot`: Snapshot volume
- `replication source`: Source for an in-progress replication to a secondary volume

WR Policy

Shown by the `details` parameter. The cache write policy:

- `write-back`: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default.
- `write-through`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

WWN

Shown by the `details` parameter. The World Wide Name of the volume, used by host-based Storage Replication Adapter (SRA) software to identify the volume.

Example Show about all volumes.

```
# show volumes
```

Show detailed information for volume `volA`.

```
# show volumes details volA
```

Basetypes • [volumes](#)

• [status](#)

See also • [create volume](#)

• [delete volumes](#)

• [expand volume](#)

• [set volume](#)

• [show disk-groups](#)

• [show maps](#)

• [show pools](#)

• [show vdisks](#)

show volume-statistics

Description Shows live performance statistics for all or specified volumes. For each volume these statistics quantify I/O operations between hosts and the volume. For example, each time a host writes to a volume's cache, the volume's statistics are adjusted. For volume performance statistics, the system samples live data every 15 seconds.

Statistics shown only in XML API output are described in ["XML API basetype properties"](#) (page 376).

Min. role monitor

Syntax `show volume-statistics`
`[volumes]`

Parameters `volumes`

Optional. A comma-separated list of the names or serial numbers of the volumes for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all volumes.

Output Name

The name of the volume.

Serial Number

The serial number of the volume.

Bytes per second

The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Allocated Pages

The number of pages allocated to the volume.

% Performance

The percentage of volume capacity occupied by data in the Performance tier.

% Standard

The percentage of volume capacity occupied by data in the Standard tier.

% Archive

The percentage of volume capacity occupied by data in the Archive tier.

% RC

The percentage of read-cache capacity that is occupied.

Reset Time

The date and time, in the format `year-month-day hour:minutes:seconds`, when these statistics were last reset, either by a user or by a controller restart.

Example Show live performance statistics for all volumes.

```
# show volume-statistics
```


Show live performance statistics for volume v0001.

```
# show volume-statistics v0001
```

Basetypes • [volume-statistics](#)
• [status](#)

See also • [reset all-statistics](#)
• [reset volume-statistics](#)
• [show volumes](#)

shutdown

Description Shuts down the Storage Controller in a controller module. This ensures that a proper failover sequence is used, which includes stopping all I/O operations and writing any data in write cache to disk. If the Storage Controller in each controller module is shut down, hosts cannot access the system's data. Perform a shut down before removing a controller module or powering down the system.

Min. role manage

Syntax shutdown
[a|b|both]

Parameters a|b|both
Optional. Specifies to shut down the Storage Controller in controller A, B, or both. If this parameter is omitted, the command affects the controller being accessed.

Example Shut down the Storage Controller in controller A.

```
# shutdown a
```

See also

- [restart](#)
- [show shutdown-status](#)

start vdisk

Description Restarts a vdisk that was stopped in order to move its disks into this system.

For a replication set, starting a vdisk is part of the process for moving a secondary volume from a primary system into a secondary system. The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

NOTE: If the replication set was deleted while the secondary volume's vdisk was stopped, restarting the vdisk will make the set partially reappear. To clean up this remnant, reattach the secondary volume, set it to be the primary volume (by using the `set replication-primary-volume` command), and then delete the replication set again.

Min. role `manage`

Syntax `start vdisk`
`vdisk`

Parameters `vdisk`

The name or serial number of the vdisk to start. A name that includes a space must be enclosed in double quotes.

Example Start vdisks `vd2` and `vd1`, which respectively contain a snap pool and the associated secondary volume.

```
# start vdisk vd2
Success: Command completed successfully. (2012-01-21 12:26:32)

# start vdisk vd1
Success: Command completed successfully. (2012-01-21 12:26:37)
```

See also

- [detach replication-volume](#)
- [reattach replication-volume](#)
- [show vdisks](#)
- [stop vdisk](#)

stop vdisk

Description Stops a vdisk to prepare its disks for removal.

For a replication set, stopping a vdisk is part of the process for moving a secondary volume from a primary system into a secondary system. The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

Before stopping a vdisk, ensure that all secondary volumes that it contains are detached. When a vdisk is stopped:

- The volumes in the vdisk become inaccessible to hosts.
- Its cached data is flushed to disk.
- Removing its disks will not cause the system to report errors or to attempt reconstruction.

NOTE: You cannot stop a vdisk that contains a primary volume.

NOTE: If a secondary volume and its snap pool are in different vdisks, you cannot stop the snap pool's vdisk until you stop the secondary volume's vdisk.

If the stop operation succeeds, the vdisk's health is shown as `Unknown` and its status is shown as `STOP`.

If the stop operation succeeded for the secondary volume's vdisk and for its snap pool's vdisk (if applicable), you can move the disks into the remote system.

Min. role `manage`

Syntax `stop vdisk`
`vdisk`

Parameters `vdisk`
The name or serial number of the vdisk to stop. A name that includes a space must be enclosed in double quotes.

Example Stop vdisks `vd1` and `vd2`, which respectively contain a secondary volume and its snap pool.

```
# stop vdisk vd1
Success: Command completed successfully. (2012-01-21 12:26:07)

# stop vdisk vd2
Success: Command completed successfully. (2012-01-21 12:26:12)
```

- See also
- [detach replication-volume](#)
 - [reattach replication-volume](#)
 - [show vdisks](#)
 - [start vdisk](#)

suspend replication

Description Suspends the current replication operation on the specified secondary volume. This command must be issued on the system that owns the secondary volume. This command applies to linear storage only.

Once suspended, the replication must be resumed or aborted to allow the volume to resume normal operation.

Min. role manage

Syntax `suspend replication`
`[set replication-set]`
`replication-volume`

Parameters `set replication-set`
Optional. The name or serial number of the replication set
`replication-volume`
The name or serial number of the secondary volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Example Suspend replication of primary volume V1 to secondary volume rV1.

```
# suspend replication rV1
```

See also

- [abort replication](#)
- [resume replication](#)
- [show replication-sets](#)
- [show replication-volumes](#)

test

Description Sends a test message to configured destinations for event notification and managed logs. After issuing this command, verify that the test message reached its destinations.

Min. role manage

Syntax test
email | managedlogs | managedlogswarn | managedlogswrap | notification | snmp
[region crash1 | crash2 | crash3 | crash4 | ecdebug | mc | scdebug]

Parameters email | managedlogs | managedlogswarn | managedlogswrap | notification | snmp

- **email:** This option behaves the same as the notification option and remains for backward compatibility only.
- **managedlogs:** Specify this option to test receipt of the managed-logs notification that logs need to be transferred. (Event 400)
- **managedlogswarn:** Specify this option to test receipt of the managed-logs notification that logs are nearly full and must be transferred to avoid losing older entries. (Event 401)
- **managedlogswrap:** Specify this option to test receipt of the managed-logs notification that logs have wrapped and older entries may be lost. (Event 402)
- **notification:** Specify this option to test receipt of event-notification messages by every interface that is configured to receive them, such as email, SNMP, and SMI-S. (Event 312)
- **snmp:** This option behaves the same as the notification option.

region crash1 | crash2 | crash3 | crash4 | ecdebug | mc | scdebug

Optional. For use with the managed logs feature, this parameter specifies the log type (debug-data region) for which to send notifications.

- **crash1, crash2, crash3, or crash4:** Specify one of these options to send notification for one of the Storage Controller's four crash logs.
- **ecdebug:** Specify this option to send notification for the Expander Controller log.
- **mc:** Specify this option to send notification for the Management Controller log.
- **scdebug:** Specify this option to send notification for the Storage Controller log, which includes the event log.

If this parameter is omitted, the command sends four representative log types: crash1, ecdebug, scdebug, and mc.

Example Test receipt of event notifications by every interface that is configured to receive them.

```
# test notification
```

Test receipt of the managed-logs notification that the SC log needs to be transferred.

```
# test managedlogs region scdebug
```

See also

- [set email-parameters](#)
- [set snmp-parameters](#)

trust

Description Enables an offline vdisk (or disk group) to be brought online for emergency data recovery. This command must be enabled before each use. If used improperly this command can cause unstable operation and data loss. Before use, carefully read the cautions and procedures below.

The `trust` command provides an opportunity to recover data from a vdisk that has failed due to disk failure. The command forces a resynchronization of the metadata (as well as time and date stamps) that unifies members of a vdisk, and essentially puts the vdisk back into an accessible state. As long as the failed disks are operable, data can be read from the disks and restored to another location.

From examining the state of the disks, if the command determines that the trust operation is unsafe—that it may result in an unstable vdisk with data corruption—the command will fail. You may then seek assistance from technical support or run the command with a special parameter to acknowledge the risk of proceeding. Otherwise, if the command determines the operation to be safe, the command will proceed.

When the “trusted” vdisk is back online, back up its data and audit the data to make sure that it is intact. Then delete that vdisk, create a new vdisk, and restore data from the backup to the new vdisk. Using a trusted vdisk is only a disaster-recovery measure. The vdisk has no tolerance for any additional failures.

The following procedure outlines the general steps for performing a trust operation, but the best procedure to follow for your situation may vary from this procedure. Before starting this procedure, it is recommended that you contact technical support for assistance in determining if the trust operation is applicable to your situation, and for assistance in performing it.

△ CAUTION:

1. Do not use the `trust` command when the storage system is unstable. For example, if there are many power or topology-change events.
 2. The `trust` command cannot be run on a quarantined vdisk. In many cases the vdisk will be automatically dequarantined. If you cannot resolve the issue that caused the disk to become quarantined such that it is automatically dequarantined, and if the trust operation is applicable to your situation, dequarantine the vdisk, confirm it is in offline state by using the `show vdisks` command, and then proceed to `trust`.
 3. Never update controller-module, expansion-module, or disk firmware when the vdisk is offline.
 4. Never clear unwritten data cache when a vdisk is offline.
 5. Do not use the `trust` command on a vdisk that failed during vdisk expansion.
 6. Do not use the `trust` command on a vdisk with status `CRIT`. Instead, add spares and let the system reconstruct the vdisk.
-

The `trust` command must be used in CLI console mode.

Steps for running the `trust` command

1. Disable background scrub of disks and vdisks to avoid running scrubs automatically.
2. Identify the cause for the vdisk becoming offline.
3. If an external issue (power, cabling, and so forth) caused the vdisk to fail, fix the external issue before continuing to the next step.
4. Disable host access to the failed vdisk. In a single-controller configuration, disconnect the host-port cables. In a dual-controller configuration:
 - a. Determine the owning controller of the failed vdisk.
 - b. As a precautionary measure, remove the host-port cables of the owning controller of the offline vdisk.

5. Unseat the spare disks associated with the vdisk to prevent reconstruction.

△ CAUTION: It is recommended to avoid reconstruction after using the `trust` command. Reconstruction causes heavy usage of disks that were already reporting errors. This usage could cause the disks to fail during reconstruction, which can cause data to be unrecoverable.

6. Enable the `trust` command.
7. Run the `trust` command on the vdisk.
8. If the `trust` command determines that it would be unsafe to proceed, it will fail. If this happens you can either:
 - Contact Support for further assistance. This is *recommended*.
 - Proceed by re-enabling `trust` and running `trust` with the `unsafe` parameter. This is *not* recommended because in most cases it will result in an unstable vdisk with data corruption.

After running the `trust` command

1. Reinsert the host-port cables.
2. Perform a complete backup of the vdisk.
3. Delete the vdisk.
4. Replace the failed disks with new disks.
5. Re-create the vdisk.
6. Restore the data from the backup performed in step 2.
7. Restore original vdisk ownership.
8. Re-enable background scrub operations.

Min. role `manage`

Syntax `trust`
 `[enable|disable]`
 `[disk-group disk-group]`
 `[unsafe]`
 `[vdisk vdisk]`

The `enable`, `disable`, `disk-group`, and `vdisk` parameters are mutually exclusive.

Parameters `enable|disable`
Optional.

- `enable`: Enables the `trust` command before use.
- `disable`: Disables the `trust` command if it is not used after being enabled. If `trust` is not explicitly disabled, it will be automatically disabled when the user's CLI session ends.

`disk-group disk-group`

Optional. The name or serial number of the disk group to trust. A name that includes a space must be enclosed in double quotes.

`unsafe`

Optional. Specifies to proceed with a trust operation that is determined to be unsafe because it must use out-of-sync or partially reconstructed disks, which in most cases will result in an unstable vdisk with data corruption.

`vdisk vdisk`

Optional. The name or serial number of the vdisk to trust. A name that includes a space must be enclosed in double quotes.

Output With the `unsafe` parameter

Location

The enclosure ID and slot number of the disk.

Serial Number

The serial number of the disk.

Type

- SAS: Enterprise SAS
- SAS MDL: Midline SAS
- sSAS: SAS SSD

State

- AVAIL: Available
- FAILED: The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.
- GLOBAL SP: Global spare
- LEFTOVR: Leftover
- VDISK: Used in a vdisk
- VDISK SP: Spare assigned to a vdisk

Partially Recon Target

- True: The disk contains partially reconstructed data.
- False: The disk does not contain partially reconstructed data.

Out Of Sync

- True: The disk data is out of sync with other disks in the vdisk.
- False: The disk data is in sync with other disks in the vdisk.

Age

The age of the disk in the vdisk. The age value starts at 1 and is incremented for all good disks in the vdisk each time there is a change in the disk configuration of the vdisk, such as when a disk is detected to have failed or be missing. Therefore, if a disk has a lower age than other disks in the vdisk, that disk is out-of-sync with the other vdisk members. This value can be used as a guide to decide which disks to physically remove before doing the trust operation to minimize the amount of corrupt data in the trusted vdisk if you want to use the `unsafe` parameter.

Example Trust a vdisk which has enough good disks to complete the trust operation. The vdisk may have out-of-sync or partially reconstructed disks but they are not needed to complete the trust operation. The command completes successfully.

```
# trust enable
Success: Command completed successfully. - Trust is enabled. (2013-09-17
04:29:28)
```

```
# trust vdisk VD1
Success: Command completed successfully. (VD1) - Trust operation completed
successfully for this vdisk. (2013-09-17 04:29:35)
```

Trust a vdisk which does not have enough good disks available to complete the trust operation. The command fails.

```
# trust enable
Success: Command completed successfully. - Trust is enabled. (2013-09-17
04:12:49)
```

```
# trust vdisk VD1
Error: The trust operation failed because the vdisk has an insufficient number
of in-sync disks. - Please contact Support for further assistance. (2013-09-17
04:13:13)
```

Trust a vdisk which has out-of-sync or partially reconstructed disks that would be needed to complete the trust operation. The command fails.

```
# trust enable
Success: Command completed successfully. - Trust is enabled. (2013-09-17
09:06:41)
```

```
# trust vdisk VD1
Error: Command failed. - The vdisk specified contains out-of-sync or partially
reconstructed disks that are necessary to restore the vdisk to an accessible
state. Continuing with the trust operation may lead to data corruption. Please
contact Support for further assistance. (2013-09-08 09:06:46)
```

Continuing the previous example, you decide to re-enable trust and proceed by specifying the unsafe parameter.

```
# trust enable
Success: Command completed successfully. - Trust is enabled. (2013-09-17
09:06:48)
```

```
# trust vdisk VD1 unsafe
Location Serial Number  Type State  Partially Reconstructed  Out Of Sync Age
-----
1.2      SN                SAS  LEFTOVR False                True      6
1.4      SN                SAS  VDISK  False                False     7
1.5      SN                SAS  LEFTOVR True                 False     4
-----
```

WARNING: Found partially reconstructed and out-of-sync disk(s). Using these disks for trust will in most cases cause data corruption.

Because of the risk of data corruption, it is recommended that you continue the trust operation only with the supervision of Support personnel. If you are ready to continue, enter "continue" at the prompt or enter "abort" to abort the operation and leave the vdisk offline.

```
> continue
```

If you continue with the trust operation, you risk corrupting data in this vdisk. Enter "accept" at the prompt if you intend to accept this risk and proceed with the trust operation or enter "abort" to abort the operation and leave the vdisk offline.

```
> accept
```

```
Success: Command completed successfully. (VD1) - Trust operation completed
successfully for this vdisk. (2013-09-17 09:07:31)
```

Abort an unsafe trust operation when you decide not to risk using bad disks.

```
# trust enable
```

```
Success: Command completed successfully. - Trust is enabled. (2013-09-17
09:05:37)
```

```
# trust vdisk vdr5 unsafe
```

```
Location Serial Number  Type State  Partially Reconstructed  Out Of Sync Age
-----
1.2      SN                SAS  LEFTOVR False                True      6
1.4      SN                SAS  VDISK   False                False     7
1.5      SN                SAS  LEFTOVR True                 False     4
-----
```

```
WARNING: Found partially reconstructed and out-of-sync disk(s). Using these
disks for trust will in most cases cause data corruption.
```

```
Because of the risk of data corruption, it is recommended that you continue
the trust operation only with the supervision of Support personnel. If you
are ready to continue, enter "continue" at the prompt or enter "abort" to
abort the operation and leave the vdisk offline.
```

```
> continue
```

```
If you continue with the trust operation, you risk corrupting data in this
vdisk. Enter "accept" at the prompt if you intend to accept this risk and
proceed with the trust operation or enter "abort" to abort the operation and
leave the vdisk offline.
```

```
> abort
```

```
Error: Command was aborted by user. (2013-09-17 09:05:49)
```

After enabling trust, disable it if you decide not to run `trust vdisk`.

```
# trust disable
```

```
Success: Command completed successfully. - Trust is disabled. (2013-09-17
17:40:01)
```

- See also
- [show disk-groups](#)
 - [show vdisks](#)
 - [verify disk-groups](#)
 - [verify vdisk](#)

unfail controller

Description Allows the partner controller module to recover from a simulated failure performed with the [fail](#) command (which requires the manage role). If you attempt to unfail a controller that is operating, the command will have no effect.

Min. role manage

Syntax `unfail controller`

Example From controller A, unfail the partner controller.

```
# unfail controller b
```

See also

- [fail](#)
- [show controllers](#)

unmap volume

Description Deletes explicit mappings or the default mapping for specified volumes. When an explicit mapping between an initiator and a volume is deleted, access by that initiator to the volume is controlled by the volume's default mapping (described in help for [create volume](#)). When a default mapping is deleted, access by initiators to the volume is controlled by any explicit mappings of those initiators to the volume. If neither mapping exists, the volume is unavailable to initiators.

If you want to mask access for a specific initiator to a specific volume, use the [map volume](#) command and set the access parameter to `no-access`.

Min. role `manage`

Syntax `unmap volume`
 `[host hosts]`
 `[initiator initiators|hosts|host-groups]`
 `volumes|volume-groups`

Parameters `host hosts`
Deprecated—use the `initiator` parameter instead.

`initiator initiators`

Optional. A comma-separated list of initiators, hosts, or host groups from which to unmap volumes. For initiator, host, and host-group syntax, see "[Command syntax](#)" (page 23). If this parameter is omitted, mapping changes apply to all initiators that are not explicitly mapped (the default mapping).

`volumes|volume-groups`

A comma-separated list of volumes or volume groups to unmap. For a volume, specify its name or serial number. For a volume group, specify the name as `volume-group.*`. A name that includes a space must be enclosed in double quotes.

Example Delete explicit mappings for Host1 to volumes V1 and V3 (leaving the default mappings, if any, unchanged).

```
# unmap volume initiator Host1.* V1,V3
```

Delete volume V2's default mapping (leaving explicit mappings, if any, unchanged).

```
# unmap volume V2
```

Delete explicit mappings for initiator FC-port1 to volume group MyVolumes (leaving the default mappings, if any, unchanged).

```
# unmap volume initiator FC-port1 MyVolumes.*.*
```

See also

- [map volume](#)
- [show initiators](#)
- [show maps](#)
- [show volumes](#)


verify disk-groups

Description Analyzes redundant disk groups to find and fix inconsistencies between their redundancy data and their user data.

This command acts on disks that are associated with a disk group and are neither dedicated spares nor leftovers. This command will fix parity mismatches for RAID 3, 5, 6, and 50, and mirror mismatches for RAID 1 and 10. This command can be performed only on a disk group whose status is FTOL (fault tolerant and online). It cannot be performed for NRAID or RAID 0.

Verification can last over an hour, depending on disk group size, utility priority, and amount of I/O activity. You can use a disk group while it is being verified. To view the progress of a verify (VRFY) job, use the `show disk-groups` command.

When verification is complete, event 21 is logged and specifies the number of inconsistencies found. Such inconsistencies can indicate that a disk is going bad.

 **TIP:** Unless you want to verify without fixing errors, it is better to use the [scrub disk-groups](#) command, which operates similarly to `verify disk-groups` and also can find and fix media errors for any RAID level, including NRAID and RAID 0.

Min. role `manage`

Syntax `verify disk-groups`
 `[fix yes|no]`
 `disk-groups`

Parameters `fix yes|no`
Optional. Specifies whether or not to automatically fix parity mismatches by making parity match the data in all cases. If you specify `no`, event 21 will report any errors found and they will not be fixed. The default is `yes`.

disk-groups

A comma-separated list of the names or serial numbers of the disk groups to verify. A name that includes a space must be enclosed in double quotes.

Example Start verifying disk group `dg1`.

```
# verify disk-group dg1
```

See also

- [abort verify](#)
- [scrub disk-groups](#)
- [show disk-groups](#)

verify links

Description Verifies host-port links.

If a remote system is specified, all link paths between the local system and the remote system are tested. Otherwise, link paths between controller A and controller B in the local system are tested. The remote system must already have been added by using the [create remote-system](#) command.

For replication purposes, this tests the links to be used for replication from one system to another system. To verify bidirectional communication, run this command from the primary system to the secondary system, and then from the secondary system to the primary system.

Min. role manage

Syntax `verify link`
 `[link-type FC|iSCSI|ALL]`
 `[remote-system system]`

Parameters `link-type FC|iSCSI|ALL`
Optional. Specifies the type of host-port links to verify:

- `FC`: Verify FC-to-FC links only.
- `iSCSI`: Verify iSCSI-to-iSCSI links only.
- `ALL`: Verify all FC-to-FC and iSCSI-to-iSCSI links.

If this parameter is omitted, all links are verified.

`remote-system system`

Optional. The remote system's name or the IP address of one of its controller network ports. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, links between the local controllers are verified.

Output `Port`
The port ID in the local system.

`Type`

- `FC`: FC port.
- `iSCSI`: iSCSI port.
- `Unknown`: Port type is unknown.

`Links`

The IDs of linked ports in the target system.

Example Verify all links between controllers A and B in the local system.

```
# verify links
```

Verify all links between the local system and remote system `System2`.

```
# verify links remote-system System2
```

Basetypes

- [remote-links](#)
- [status](#)

See also

- [show remote-systems](#)
- [verify remote-link](#)

verify remote-link

Description Verifies host-port links between the local system and a specified remote system. This command applies to linear storage only.

All link paths, or only paths having a specified link type, between the two systems are tested. The remote system must already have been added by using the [create remote-system](#) command.

For replication purposes, this tests the links to be used for replication from one system to another system. To verify bidirectional communication, run this command from the primary system to the secondary system, and then from the secondary system to the primary system.

Min. role manage

Syntax `verify remote-link`
`[link-type FC|iSCSI|ALL]`
`remote-system system`

Parameters `link-type FC|iSCSI|ALL`
Optional. Specifies the type of host-port links to verify:

- `FC`: Verify FC-to-FC links only.
- `iSCSI`: Verify iSCSI-to-iSCSI links only.
- `ALL`: Verify all FC-to-FC and iSCSI-to-iSCSI links.

If this parameter is omitted, all links are verified.

`remote-system system`

The remote system's name or the IP address of one of its controller network ports.

Output `Port`
The port ID in the local system.

`Type`

- `FC`: FC port.
- `iSCSI`: iSCSI port.
- `Unknown`: Port type is unknown.

`Links`

The IDs of linked ports in the remote system.

Example Verify all links between the local system and a remote system.

```
# verify remote-link remote-system System2
```

Verify only iSCSI links between two systems having FC and iSCSI ports.

```
# verify remote-link remote-system System2 link-type iSCSI
```

Basetypes

- [remote-links](#)
- [status](#)

See also

- [show remote-systems](#)
- [verify links](#)


verify vdisk

Description Analyzes redundant vdisks to find and fix inconsistencies between their redundancy data and their user data.

This command acts on disks that are associated with a vdisk and are neither dedicated spares nor leftovers. This command will fix parity mismatches for RAID 3, 5, 6, and 50, and mirror mismatches for RAID 1 and 10. This command can be performed only on a vdisk whose status is FTOL (fault tolerant and online). It cannot be performed for NRAID or RAID 0.

Verification can last over an hour, depending on vdisk size, utility priority, and amount of I/O activity. You can use a vdisk while it is being verified. To view the progress of a verify (VRFY) job, use the [show vdisks](#) command.

When verification is complete, event 21 is logged and specifies the number of inconsistencies found. Such inconsistencies can indicate that a disk is going bad.

 **TIP:** Unless you want to verify without fixing errors, it is better to use the [scrub vdisk](#) command, which operates similarly to `verify vdisk` and also can find and fix media errors for any RAID level, including NRAID and RAID 0.

Min. role manage

Syntax `verify vdisk`
 `[fix yes|no]`
 `vdisks`

Parameters `fix yes|no`
Optional. Specifies whether or not to automatically fix parity mismatches by making parity match the data in all cases. If you specify `no`, event 21 will report any errors found and they will not be fixed. The default is `yes`.

vdisks

A comma-separated list of the names or serial numbers of the vdisks to verify. A name that includes a space must be enclosed in double quotes.

Example Start verifying vdisk `vd1`.

```
# verify vdisk vd1
```

See also

- [abort verify](#)
- [scrub vdisk](#)
- [show vdisks](#)
- [verify disk-groups](#)

versions (Deprecated)

Use [show versions](#).

volumecopy

Description Copies a standard, master, or snapshot volume to a new standard volume. This command applies to linear storage only.

The destination volume you specify must be in a vdisk owned by the same controller as the source volume. If the source volume is a snapshot, you can choose whether to include its modified data (data written to the snapshot since it was created). The destination volume is completely independent of the source volume.

The first time a volume copy is created of a standard volume, the volume is converted to a master volume and a snap pool is created in the volume's vdisk. The snap pool's size is either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Before creating or scheduling copies, verify that the vdisk has enough free space to contain the snap pool.

Before copying a master volume, verify that the snap-pool has space for a transient snapshot, which is used to track changes to the master volume while the copy is in progress.

For a master volume, the volume copy creates a transient snapshot, copies the data from the snapshot, and deletes the snapshot when the copy is complete. For a snapshot, the volume copy is performed directly from the source. This source data may change if modified data is to be included in the copy and the snapshot is mounted/presented/mapped and I/O is occurring to it.

To ensure the integrity of a copy of a master volume, unmount/unpresent/unmap the volume or at minimum perform a system cache flush and refrain from writing to the volume. Since the system cache flush is not natively supported on all operating systems, it is recommended to unmount/unpresent/unmap temporarily. The volume copy is for all data on the disk at the time of the request, so if there is data in the operating-system cache, that will not be copied over. Unmounting/unpresenting/unmapping the volume forces the cache flush from the operating system. After the volume copy has started, it is safe to remount/re-present/remap the volume and/or resume I/O.

To ensure the integrity of a copy of a snapshot with modified data, unmount/unpresent/unmap the snapshot or perform a system cache flush. The snapshot will not be available for read or write access until the volume copy is complete, at which time you can remount/re-present/remap the snapshot. If modified write data is not to be included in the copy, then you may safely leave the snapshot mounted/presented/mapped. During a volume copy using snapshot modified data, the system takes the snapshot offline.

While the copy operation is in progress, the destination volume type is shown as `standard*`. When complete, it changes to `standard`. To see the volume copy's progress use the [show volumecopy-status](#) command.

Min. role `manage`

Syntax `volumecopy`
`dest-vdisk vdisk`
`[modified-snapshot yes|no]`
`[prompt yes|no|expert]`
`source-volume source-volume`
`destination-volume`

Parameters `dest-vdisk vdisk`

The name or serial number of the destination vdisk. A name that includes a space must be enclosed in double quotes.

`modified-snapshot yes|no`

Optional. Specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot.

- `yes`: Include modified snapshot data.
- `no`: Exclude modified snapshot data.

If this parameter is omitted for a snapshot, modified snapshot data is excluded.

prompt `yes|no|expert`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.
- `expert`: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

source-volume `source-volume`

The name or serial number of the volume or snapshot to copy. A name that includes a space must be enclosed in double quotes.

destination-volume

A name for the volume to create in the destination vdisk. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes, where ASCII characters are 1 byte, most Latin (Western European) characters with diacritics are 2 bytes, and most Asian characters are 3 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Example Copy master volume MV1 to new volume MV1copy on vdisk VD2.

```
# volumecopy source-volume MV1 dest-vdisk VD2 MV1copy
```

The source volume **MUST** be unmounted from all hosts prior to starting a volume copy.

Are you ready to continue? (y/n) **yes**

Copy standard volume V1 on vdisk vd01 to new volume V1_copy on the same vdisk.

```
# volumecopy source-volume V1 dest-vdisk vd01 V1_copy
```

Info: Volume Copy (spV1) was created.

Info: Volume V1 was converted to a master volume. (V1)

The source volume **MUST** be unmounted from all hosts prior to starting a volume copy.

Are you ready to continue? (y/n) **yes**

- See also
- [abort volumecopy](#)
 - [create task](#)
 - [show vdisks](#)
 - [show volumecopy-status](#)
 - [show volumes](#)

4 XML API basetype properties

[Chapter 3](#) describes command output that is shown in console format. This chapter describes the basetype properties that CLI commands display in XML API format, and is organized to help you find a basetype by name. This chapter excludes basetypes that are for internal use only.

Each basetype topic includes the following information:

- References to CLI commands that directly use the basetype.
- For each property, the values of its name and type elements, and a description of the values that the property may show. For descriptions of other elements see [Table 3](#) (page 20).
- References to embedded or nested basetypes that the output may show.

advanced-settings-table

This basetype is used by [show advanced-settings](#).

Table 11 advanced-settings-table properties

Name	Type	Description
background-scrub	string	Shows whether disks in disk groups are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the <code>background-scrub-interval</code> parameter. <ul style="list-style-type: none"> Disabled: Background disk-group scrub is disabled. This is the default. Enabled: Background disk-group scrub is enabled.
background-scrub-numeric	uint32	Numeric equivalents for <code>background-scrub</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
background-scrub-interval	uint16	Shows the interval between background disk-group scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.
partner-firmware-upgrade	string	Shows whether component firmware versions are monitored and will be automatically updated on the partner controller. <ul style="list-style-type: none"> Disabled: Partner firmware upgrade is disabled. Enabled: Partner firmware upgrade is enabled. This is the default.
partner-firmware-upgrade-numeric	uint32	Numeric equivalents for <code>partner-firmware-upgrade</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
utility-priority	string	Priority at which data-redundancy utilities, such as <code>vdisk verify</code> and <code>reconstruct</code> , run with respect to I/O operations competing for the system's processors. (This does not affect <code>vdisk background scrub</code> , which always runs at "background" priority.) <ul style="list-style-type: none"> High: Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default. Medium: Utility performance is balanced with host I/O performance. Low: Utilities run at a slower rate with minimal effect on host I/O.
utility-priority-numeric	uint32	Numeric equivalents for <code>utility-priority</code> values. <ul style="list-style-type: none"> 0: High 1: Medium 2: Low
smart	string	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none"> Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system. Enabled: SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default. Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.
smart-numeric	uint32	Numeric equivalents for <code>smart</code> values. <ul style="list-style-type: none"> 0: Detect-Only 1: Enabled 2: Disabled
dynamic-spare	string	Shows whether the storage system will automatically use a compatible disk as a spare to replace a failed disk in a <code>vdisk</code> if no compatible spare is available. <ul style="list-style-type: none"> Disabled: The dynamic spares feature is disabled. This is the default. Enabled: The dynamic spares feature is enabled.

Table 11 advanced-settings-table properties (continued)

Name	Type	Description
emp-poll-rate	uint32	Shows the interval in seconds at which the storage system will poll each enclosure's Enclosure Management Processor (EMP) for status changes, from 5 to 3600 seconds. The default is 5 seconds.
host-cache-control	string	Shows whether hosts are allowed to use the SCSI <code>MODE SELECT</code> command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> Disabled: Host control of caching is disabled. This is the default. Enabled: Host control of caching is enabled.
host-cache-control-numeric	uint32	Numeric equivalents for <code>host-cache-control</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
sync-cache-mode	string	Shows how the SCSI <code>SYNCHRONIZE CACHE</code> command is handled. <ul style="list-style-type: none"> Immediate: Good status is returned immediately and cache content is unchanged. This is the default. Flush To Disk: Good status is returned only after all write-back data for the specified volume is flushed to disk.
sync-cache-mode-numeric	uint32	Numeric equivalents for <code>sync-cache-mode</code> values. <ul style="list-style-type: none"> 0: Immediate 1: Flush to Disk
independent-cache	string	Shows the cache redundancy mode for a dual-controller storage system. <ul style="list-style-type: none"> Disabled: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. Enabled: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
independent-cache-numeric	uint32	Numeric equivalents for <code>independent-cache</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
missing-lun-response	string	Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access. <ul style="list-style-type: none"> Not Ready: Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is sensekey = 2, code = 4, qualifier = 3. This is the default. Illegal Request: Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is sensekey = 5, code = 25h, qualifier = 0.
missing-lun-response-numeric	uint32	Numeric equivalents for <code>missing-lun-response</code> values. <ul style="list-style-type: none"> 0: Not Ready 1: Illegal Request
controller-failure	string	Shows whether the cache policy will change from write-back to write-through when a controller fails. <ul style="list-style-type: none"> Disabled: The controller failure trigger is disabled. This is the default. Enabled: The controller failure trigger is enabled.
controller-failure-numeric	uint32	Numeric equivalents for <code>controller-failure</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Table 11 advanced-settings-table properties (continued)

Name	Type	Description
super-cap-failure	string	Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails. <ul style="list-style-type: none"> Disabled: The supercapacitor failure trigger is disabled. Enabled: The supercapacitor failure trigger is enabled. This is the default.
super-cap-failure-numeric	uint32	Numeric equivalents for super-cap-failure values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
compact-flash-failure	string	Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation. <ul style="list-style-type: none"> Disabled: The CompactFlash failure trigger is disabled. Enabled: The CompactFlash failure trigger is enabled. This is the default.
compact-flash-failure-numeric	uint32	Numeric equivalents for compact-flash-failure values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
power-supply-failure	string	Shows whether the cache policy will change from write-back to write-through when a power supply fails. <ul style="list-style-type: none"> Disabled: The power-supply failure trigger is disabled. This is the default. Enabled: The power-supply failure trigger is enabled.
power-supply-failure-numeric	uint32	Numeric equivalents for power-supply-failure values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
fan-failure	string	Shows whether the cache policy will change from write-back to write-through when a fan fails. <ul style="list-style-type: none"> Disabled: The fan failure trigger is disabled. This is the default. Enabled: The fan failure trigger is enabled.
fan-failure-numeric	uint32	Numeric equivalents for fan-failure values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
temperature-exceeded	string	Shows whether the system will shut down a controller when its temperature exceeds the critical operating range. <ul style="list-style-type: none"> Disabled: The over-temperature trigger is disabled. This is the default. Enabled: The over-temperature trigger is enabled.
temperature-exceeded-numeric	uint32	Numeric equivalents for temperature-exceeded values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
partner-notify	string	Shows whether the partner controller will be notified when a trigger condition occurs. <ul style="list-style-type: none"> Disabled: Notification is disabled. The partner controller will continue using its current caching mode. This is the default. Enabled: Notification is enabled. The partner controller will change to write-through mode for better data protection.
partner-notify-numeric	uint32	Numeric equivalents for partner-notify values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Table 11 advanced-settings-table properties (continued)

Name	Type	Description
auto-write-back	string	Shows whether the cache policy will change from write-through to write-back when the trigger condition is cleared. <ul style="list-style-type: none"> Disabled: Auto-write-back is disabled. Enabled: Auto-write-back is enabled. This is the default.
auto-write-back-numeric	uint32	Numeric equivalents for auto-write-back values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-dsd-enable	string	Shows whether available disks and global spares will spin down after a period of inactivity shown by the disk-dsd-delay property. <ul style="list-style-type: none"> Disabled: Drive spin down for available disks and global spares is disabled. This is the default. Enabled: Drive spin down for available disks and global spares is enabled.
disk-dsd-enable-numeric	uint32	Numeric equivalents for disk-dsd-enable values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-dsd-delay	uint16	Specifies the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.
background-disk-scrub	string	Shows whether disks that are not in vdisks are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 72 hours. <ul style="list-style-type: none"> Disabled: Background disk scrub is disabled. This is the default. Enabled: Background disk scrub is enabled.
background-disk-scrub-numeric	uint32	Numeric equivalents for background-disk-scrub values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
managed-logs	string	Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log-collection system to avoid losing diagnostic data as logs fill. <ul style="list-style-type: none"> Disabled: The managed logs feature is disabled. This is the default. Enabled: The managed logs feature is enabled.
managed-logs-numeric	uint32	Numeric equivalents for managed-logs values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
single-controller	string	For a 2U14 or 2U24 system that had two controller modules but now has only one and is intended to be used as a single-controller system, this property shows whether the operating/redundancy mode is set to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP. <ul style="list-style-type: none"> Enabled: Single Controller mode is enabled. Disabled: Single Controller mode is disabled.
single-controller-numeric	string	Numeric equivalents for single-controller values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-protection-info	string	Not supported.

Table 11 advanced-settings-table properties (continued)

Name	Type	Description
disk-protection-info-numeric	uint32	Not supported.
auto-stall-recovery	string	Shows whether the auto-stall recovery feature is enabled, which detects situations where a controller stall is preventing I/O operations from completing, and recovers the system so that at least one controller is operational, thus avoiding data-unavailability situations. <ul style="list-style-type: none"> Disabled: Auto-stall recovery is disabled. Enabled: Auto-stall recovery is enabled.
auto-stall-recovery-numeric	uint32	Numeric equivalents for auto-stall-recovery values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

attribute-priorities

This basetype is used by [show priorities](#).

Table 12 attribute-priorities properties

Name	Type	Description
attribute-name	string	<p>Snapshot retention attribute.</p> <ul style="list-style-type: none">• Standard Snapshot• Volume Copy Snapshot: A snapshot that is being used to copy data from a source volume to a destination volume. This attribute is temporary for the duration of the volume-copy process.• Replication Snapshot• Replicating Snapshot: A snapshot that is being replicated to a secondary volume. This snapshot is required in order to resume the replication. The attribute is temporary for the duration of the replication process.• Common Sync Point Snapshot: The latest snapshot that is copy-complete on all secondary volumes. It identifies a common point in time that is known by all destinations.• Only Sync Point Snapshot: The only sync point that is available on at least one secondary volume. If this snapshot is removed, then the next replication requires a full sync to be performed.• Queued Snapshot: A snapshot that was taken for remote replication but is queued waiting for the previous replications to complete.• DRM Snapshot: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).
priority-value	string	Retention priority for the corresponding attribute. Values are shown as hexadecimal numbers.

cache-parameter

This basetype is used by [show cache-parameters](#), when a volume is specified, to show volume cache properties.

Table 13 cache-parameter properties

Name	Type	Description
serial-number	string	If a volume is specified, its serial number.
volume-name	string	If a volume is specified, its name.
write-policy	string	If a volume is specified, its cache write policy. <ul style="list-style-type: none"> write-back: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default. write-through: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.
write-policy-numeric	uint32	Numeric equivalents for write-policy values. <ul style="list-style-type: none"> 0: write-through 1: write-back
cache-optimization	string	If a volume is specified, its cache optimization mode. <ul style="list-style-type: none"> standard: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default. no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.
cache-optimization-numeric	uint32	Numeric equivalents for cache-optimization values. <ul style="list-style-type: none"> 0: standard 2: no-mirror
read-ahead-size	string	If a volume is specified, its read-ahead cache setting. <ul style="list-style-type: none"> Disabled: Read-ahead is disabled. Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload. Stripe: Read-ahead is set to one stripe. The controllers treat non-RAID and RAID-1 vdisks internally as if they have a stripe size of 512 KB, even though they are not striped. 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.
read-ahead-size-numeric	uint32	Numeric equivalents for read-ahead-size values. <ul style="list-style-type: none"> -2: Stripe -1: Adaptive 0: Disabled 524288: 512 KB 1048576: 1 MB 2097152: 2 MB 4194304: 4 MB 8388608: 8 MB 16777216: 16 MB 33554432: 32 MB -2147483648: Maximum

cache-settings

This basetype is used by [show cache-parameters](#) to show system cache properties.

Table 14 cache-settings properties

Name	Type	Description
operation-mode	string	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none">• Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.• Active-Active ULP: Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.• Single Controller: There is only a single controller in the enclosure.• Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.• Down: Both controllers are not operational.
operation-mode-numeric	uint32	Numeric equivalents for operation-mode values. <ul style="list-style-type: none">• 1: Independent Cache Performance Mode• 2: Active-Active ULP• 3: Single Controller• 4: Failed Over• 5: Down
controller-cache-parameters		Embedded; see controller-cache-parameters .

certificate-status

This basetype is used by [show certificate](#).

Table 15 certificate-status properties

Name	Type	Description
controller	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-numeric	string	Numeric equivalents for controller values. <ul style="list-style-type: none">• 0: A• 1: B
certificate-status	string	<ul style="list-style-type: none">• Default: No customer-supplied or alternate certificate has been installed.• Customer-supplied: A custom or alternate certificate has been installed.
certificate-status-numeric	uint32	Numeric equivalents for certificate-status values. <ul style="list-style-type: none">• 0: Default• 1: Customer-supplied
certificate-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the custom certificate was created.
certificate-signature	string	The first few characters of the certificate file. This property is for diagnostic purposes, and can be used to verify that the proper certificate is in use.
certificate-text	string	The full text of the certificate.

chap-records

This basetype is used by [show chap-records](#).

Table 16 chap-records properties

Name	Type	Description
initiator-name	string	The originator name.
initiator-secret	string	The secret that the recipient uses to authenticate the originator.
oname	string	For mutual CHAP, the recipient name.
osecret	string	For mutual CHAP, the secret that the originator uses to authenticate the recipient.

cli-parameters

This basetype is used by [show cli-parameters](#).

Table 17 cli-parameters properties

Name	Type	Description
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).
output-format	string	<ul style="list-style-type: none"> console: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. This is the default. api: Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by COMP elements. api-embed: Alternate form of XML output which displays “child” objects embedded (indented) under “parent” objects. ipa: Alternate form of XML output. json: Alternate data-interchange format.
output-format-api	string	<ul style="list-style-type: none"> console api api-brief api-embed api-embed-brief json json-full
output-format-api-numeric	uint32	Numeric equivalents for output-format-api values. <ul style="list-style-type: none"> 1: console 2: api 3: api-brief 4: api-embed 5: api-embed-brief 6: json 7: json-full
brief-mode	string	<ul style="list-style-type: none"> Enabled: In XML output, this setting shows a subset of attributes of object properties. The name and type attributes are always shown. Disabled: In XML output, this setting shows all attributes of object properties. This is the default.
brief-mode-numeric	uint32	Numeric equivalents for brief-mode values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
base	uint8	Alias for storage-size-base.
pager	string	<ul style="list-style-type: none"> Enabled: Halts output after each full screen to wait for keyboard input. This is the default. Disabled: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.
pager-numeric	uint32	Numeric equivalents for pager values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Table 17 cli-parameters properties (continued)

Name	Type	Description
locale	string	<p>Display language.</p> <ul style="list-style-type: none"> • English (the default) • Spanish • French • German • Italian • Japanese • Korean • Dutch • Chinese-simplified • Chinese-traditional
locale-numeric	uint32	<p>Numeric equivalents for locale values.</p> <ul style="list-style-type: none"> • 0: English • 1: Spanish • 2: French • 3: German • 4: Italian • 5: Japanese • 9: Korean • 6: Dutch • 7: Chinese-simplified • 8: Chinese-traditional
storage-size-base	uint8	<p>Base for entry and display of storage-space sizes.</p> <ul style="list-style-type: none"> • 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. • 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. <p>Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.</p>
storage-size-precision	uint8	<p>Number of decimal places (1–10) for display of storage-space sizes. The default is 1.</p>
storage-size-units	string	<p>Unit for display of storage-space sizes.</p> <ul style="list-style-type: none"> • Auto: Lets the system determine the proper unit for a size. This is the default. • MB: Sizes are shown in megabytes. • GB: Sizes are shown in gigabytes. • TB: Sizes are shown in terabytes. <p>Based on the precision setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if storage-size-units is set to TB, storage-size-precision is set to 1, and storage-size-base is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.</p>
storage-size-units-numeric	uint32	<p>Numeric equivalents for storage-size-units values.</p> <ul style="list-style-type: none"> • 0: Auto • 1: MB • 2: GB • 3: TB
temperature-scale	string	<ul style="list-style-type: none"> • Fahrenheit: Temperatures are shown in degrees Fahrenheit. • Celsius: Temperatures are shown in degrees Celsius. This is the default.

Table 17 cli-parameters properties (continued)

Name	Type	Description
temperature-scale-numeric	uint32	Numeric equivalents for temperature-scale values. <ul style="list-style-type: none"> • 0: Fahrenheit • 1: Celsius
user-type	string	The logged-in user's experience level. <ul style="list-style-type: none"> • Novice • Standard (the default) • Advanced • Diagnostic
user-type-numeric	uint32	Numeric equivalents for user-type values. <ul style="list-style-type: none"> • 1: Novice • 2: Standard • 3: Advanced • 4: Diagnostic
username	string	The logged-in user name.
management-mode	string	The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session. <ul style="list-style-type: none"> • v2: Uses terminology that is oriented to managing linear storage. For example, <i>vdisk</i> for disk groups and pools. • v3: Uses terminology that is oriented to managing virtual and linear storage. For example, <i>disk group</i> for disk groups and <i>pool</i> for pools.
management-mode-numeric	string	Numeric equivalents for management-mode values. <ul style="list-style-type: none"> • 2: v2 • 3: v3

code-load-readiness

This basetype is used by [check firmware-upgrade-health](#).

Table 18 code-load-readiness properties

Name	Type	Description
overall-health	string	<ul style="list-style-type: none">• Pass: There are no risks to performing firmware upgrade.• Fail: At least one condition exists that presents a risk of upgrade failure or loss of availability.
overall-health-numeric	string	Numeric equivalents for overall-health values. <ul style="list-style-type: none">• 0: Pass• 1: Fail
code-load-readiness-reasons		Embedded; see code-load-readiness-reasons .

code-load-readiness-reasons

This basetype is used by [check firmware-upgrade-health](#).

Table 19 code-load-readiness-reasons properties

Name	Type	Description
readiness-reason	string	The condition that was detected.
readiness-reason-numeric	string	Numeric equivalents for readiness-reason values.
failure-risks	string	The problems that are likely to result if you do not resolve the conditions before performing a firmware upgrade.
failure-risks-numeric	string	Numeric equivalents for failure-risks values.

compact-flash

This basetype is used by [show controllers](#).

Table 20 compact-flash properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none">• Ctlr A CF: CompactFlash card in controller A.• Ctlr B CF: CompactFlash card in controller B.
controller-id	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none">• 0: B• 1: A
name	string	<ul style="list-style-type: none">• Controller A CompactFlash• Controller B CompactFlash
status	string	<ul style="list-style-type: none">• Not Installed• Installed
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: Not Installed• 1: Installed
cache-flush	string	<ul style="list-style-type: none">• Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.• Disabled: Cache flush is disabled.
cache-flush-numeric	uint32	Numeric equivalents for cache-flush values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
health	string	<ul style="list-style-type: none">• OK• Fault• N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 2: Fault• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended action to take to resolve the health issue.

controller-cache-parameters

This basetype is used by [show cache-parameters](#) to show controller cache properties.

Table 21 controller-cache-parameters properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"> cache-params-a: Cache parameters for controller A. cache-params-b: Cache parameters for controller B.
controller-id	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none"> 0: B 1: A
name	string	<ul style="list-style-type: none"> Controller A Cache Parameters Controller B Cache Parameters
write-back-status	string	Shows the current, system-wide cache policy as determined by auto-write-through logic. This value is not settable by users. If an auto-write-through trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. <ul style="list-style-type: none"> Enabled: Write-back. This is the normal state. Disabled: Write-through. Not up: The controller is not up.
write-back-status-numeric	uint32	Numeric equivalents for write-back-status values. <ul style="list-style-type: none"> 0: Enabled (write-back) 1: Disabled (write-through) 2: Not up
compact-flash-status	string	<ul style="list-style-type: none"> Not Installed: The CompactFlash card is not installed. Installed: The CompactFlash card is installed.
compact-flash-status-numeric	uint32	Numeric equivalents for compact-flash-status values. <ul style="list-style-type: none"> 0: Not Installed 1: Installed
compact-flash-health	string	<ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
compact-flash-health-numeric	uint32	Numeric equivalents for compact-flash-health values. <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A

Table 21 controller-cache-parameters properties (continued)

Name	Type	Description
cache-flush	string	<ul style="list-style-type: none">• Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.• Disabled: Cache flush is disabled.
cache-flush-numeric	uint32	Numeric equivalents for cache-flush values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled

controllers

This basetype is used by [show configuration](#) and [show controllers](#).

Table 22 controllers properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"> controller a controller b
controller-id	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-id-numeric	uint32	<ul style="list-style-type: none"> 0: B 1: A
serial-number	string	<ul style="list-style-type: none"> Serial number of the controller module. Not Available: The controller module is down or not installed.
hardware-version	string	Controller module hardware version.
cpld-version	string	Complex Programmable Logic Device (CPLD) firmware version.
mac-address	string	Controller network port MAC address.
node-wwn	string	Storage system World Wide Node Name (WWNN).
active-version	uint32	The configured network port IP version. <ul style="list-style-type: none"> 4: IPv4 6: IPv6
ip-address	string	Controller network port IP address.
ip-subnet-mask	string	Controller network port IP subnet mask.
ip-gateway	string	Controller network port gateway IP address.
disks	uint32	Number of disks in the storage system.
number-of-storage-pools	uint32	Number of virtual pools in the storage system.
virtual-disks	uint32	Number of disk groups in the storage system.
cache-memory-size	uint32	Controller cache memory size (MB).
host-ports	uint32	Number of host ports in the controller module.
drive-channels	uint32	Number of expansion ports in the controller enclosure.
drive-bus-type	string	Controller interface to disks. <ul style="list-style-type: none"> SAS
drive-bus-type-numeric	uint32	Numeric equivalent for drive-bus-type value. <ul style="list-style-type: none"> 8: SAS
status	string	<ul style="list-style-type: none"> Operational Down Not installed Unknown

Table 22 controllers properties (continued)

Name	Type	Description
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Operational 1: Down 2: Not installed 3: Unknown
failed-over	string	Indicates whether the partner controller has failed over to this controller. <ul style="list-style-type: none"> No: The partner controller has not failed over to this controller. Yes: The partner controller has either failed or been shut down, and its responsibilities have been taken over by this controller. There will be a delay between the time that the value of the status property becomes Down for one controller and the time that the value of the failed-over property becomes Yes for the other controller. This time period is the time that it takes for a controller to take over the responsibilities of its partner.
failed-over-numeric	uint32	Numeric equivalents for failed-over values. <ul style="list-style-type: none"> 0: No 1: Yes
fail-over-reason	string	If failed-over is Yes, a reason for the failover appears; otherwise, Not applicable appears.
fail-over-reason-numeric	uint32	Numeric equivalents for fail-over-reason values.
sc-fw	string	Storage Controller firmware version.
vendor	string	Controller manufacturer.
model	string	Controller model.
sc-cpu-type	string	Storage Controller processor type.
sc-cpu-speed	sint32	Storage Controller processor speed.
internal-serial-number	string	Internal serial number of the controller.
cache-lock	string	Shows whether hosts are prevented from using the SCSI MODE SELECT command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> No: Hosts are permitted to disable write-back cache. Yes: Hosts are prevented from disabling write-back cache.
cache-lock-numeric	uint32	Numeric equivalents for cache-lock values. <ul style="list-style-type: none"> 0: No 1: Yes
write-policy	string	The current, system-wide cache policy as determined by auto-write-through (AWT) logic. This value is not settable by users. If an AWT trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. <ul style="list-style-type: none"> write-back: This is the normal state. write-through Not up: The controller is not up.
write-policy-numeric	uint32	Numeric equivalents for write-policy values. <ul style="list-style-type: none"> 0: write-back 1: write-through 2: Not up.

Table 22 controllers properties (continued)

Name	Type	Description
description	string	FRU long description.
part-number	string	Part number for the FRU.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the controller's PCBA was programmed.
mfg-date-numeric	uint32	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	string	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
position	string	Position of the controller in the enclosure. <ul style="list-style-type: none"> • Top: The controller is in the top slot. • Bottom: The controller is in the bottom slot.
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"> • 0: Top • 1: Bottom
phy-isolation	string	Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller. <ul style="list-style-type: none"> • Enabled: PHY fault isolation is enabled. • Disabled: PHY fault isolation is disabled.
phy-isolation-numeric	uint32	Numeric equivalents for phy-isolation values. <ul style="list-style-type: none"> • 0: Enabled • 1: Disabled

Table 22 controllers properties (continued)

Name	Type	Description
redundancy-mode	string	<p>The system's operating mode, also called the cache redundancy mode.</p> <ul style="list-style-type: none"> • Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. • Active-Active ULP: Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. • Single Controller: The enclosure contains a single controller. • Single Controller: The enclosure contains a single controller. • Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. • Down: Both controllers are not operational.
redundancy-mode-numeric	uint32	<p>Numeric equivalents for redundancy-mode values.</p> <ul style="list-style-type: none"> • 1: Independent Cache Performance Mode • 2: Active-Active ULP • 3: Single Controller • 4: Failed Over • 5: Down
redundancy-status	string	<ul style="list-style-type: none"> • Redundant with independent cache: Both controllers are operational but are not mirroring their cache metadata to each other. • Redundant: Both controllers are operational. • Operational but not redundant: In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational. • Down: This controller is not operational. • Unknown: Status information is not available.
redundancy-status-numeric	uint32	<p>Numeric equivalents for redundancy-status values.</p> <ul style="list-style-type: none"> • 0: Operational but not redundant • 1: Redundant with independent cache • 3: Redundant • 4: Down • 5: Unknown
unhealthy-component	Embedded; see unhealthy-component .	
ip-address	Embedded; see network-parameters .	
port-details	Embedded; see port .	
enclosure-id	Embedded; see expander-ports .	
compact-flash	Embedded; see compact-flash .	

controller-statistics

This basetype is used by [show controller-statistics](#).

Table 23 controller-statistics properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"> controller a controller b
cpu-load	uint32	Percentage of time the CPU is busy, from 0 to 100.
power-on-time	uint32	Number of seconds since the controller was restarted.
write-cache-used	uint32	Percentage of write cache in use, from 0 to 100.
bytes-per-second	uint64	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	For the controller whose host ports had I/O activity, the number of read operations since these statistics were last reset or since the controller was restarted.
read-cache-hits	uint64	For the controller that owns the volume, the number of times the block to be read is found in cache.
read-cache-misses	uint64	For the controller that owns the volume, the number of times the block to be read is not found in cache.
number-of-writes	uint64	For the controller whose host ports had I/O activity, the number of write operations since these statistics were last reset or since the controller was restarted.
write-cache-hits	uint64	For the controller that owns the volume, the number of times the block written to is found in cache.
write-cache-misses	uint64	For the controller that owns the volume, the number of times the block written to is not found in cache.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
num-forwarded-cmds	uint32	The current count of commands that are being forwarded or are queued to be forwarded to the partner controller for processing. This value will be zero if no commands are being forwarded or are queued to be forwarded.
reset-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted reset-time value.
start-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <i>iops</i> and <i>bytes-per-second</i> values.

Table 23 controller-statistics properties (continued)

Name	Type	Description
start-sample-time-numeric	uint32	Unformatted start-sample-time value.
stop-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the iops and bytes-per-second values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.
total-power-on-hours	string	The total amount of hours the controller has been powered on in its life time.

debug-log-parameters

This basetype is used by [show debug-log-parameters](#).

Table 24 debug-log-parameters properties

Name	Type	Description
host-dbg	string	Shows whether host interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled.
host-dbg-numeric	uint32	Numeric equivalents for host values. <ul style="list-style-type: none">• 0: Off• 1: On
disk	string	Shows whether disk interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled.
disk-numeric	uint32	Numeric equivalents for disk values. <ul style="list-style-type: none">• 0: Off• 1: On
mem	string	Shows whether internal memory debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled.
mem-numeric	uint32	Numeric equivalents for mem values. <ul style="list-style-type: none">• 0: Off• 1: On
fo	string	Shows whether failover and recovery debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled.
fo-numeric	uint32	Numeric equivalents for fo values. <ul style="list-style-type: none">• 0: Off• 1: On
msg	string	Shows whether inter-controller message debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled.
msg-numeric	uint32	Numeric equivalents for msg values. <ul style="list-style-type: none">• 0: Off• 1: On
ioa	string	Shows whether standard debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled.
ioa-numeric	uint32	Numeric equivalents for ioa values. <ul style="list-style-type: none">• 0: Off• 1: On

Table 24 debug-log-parameters properties (continued)

Name	Type	Description
iob	string	Shows whether resource-count debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
iob-numeric	uint32	Numeric equivalents for iob values. <ul style="list-style-type: none"> 0: Off 1: On
ioc	string	Shows whether upper-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
ioc-numeric	uint32	Numeric equivalents for ioc values. <ul style="list-style-type: none"> 0: Off 1: On
iod	string	Shows whether lower-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
iod-numeric	uint32	Numeric equivalents for iod values. <ul style="list-style-type: none"> 0: Off 1: On
misc	string	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
misc-numeric	uint32	Numeric equivalents for misc values. <ul style="list-style-type: none"> 0: Off 1: On
rcm	string	Shows whether removable-component manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
rcm-numeric	uint32	Numeric equivalents for rcm values. <ul style="list-style-type: none"> 0: Off 1: On
raid	string	Shows whether RAID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
raid-numeric	uint32	Numeric equivalents for raid values. <ul style="list-style-type: none"> 0: Off 1: On

Table 24 debug-log-parameters properties (continued)

Name	Type	Description
cache	string	Shows whether cache debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
cache-numeric	uint32	Numeric equivalents for cache values. <ul style="list-style-type: none"> 0: Off 1: On
emp	string	Shows whether Enclosure Management Processor debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
emp-numeric	uint32	Numeric equivalents for emp values. <ul style="list-style-type: none"> 0: Off 1: On
capi	string	Shows whether Internal Configuration API debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
capi-numeric	uint32	Numeric equivalents for capi values. <ul style="list-style-type: none"> 0: Off 1: On
mui	string	Shows whether internal service interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
mui-numeric	uint32	Numeric equivalents for mui values. <ul style="list-style-type: none"> 0: Off 1: On
bkcfg	string	Shows whether internal configuration debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
bkcfg-numeric	uint32	Numeric equivalents for bkcfg values. <ul style="list-style-type: none"> 0: Off 1: On
awt	string	Shows whether debug messages for auto-write-through cache triggers are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
awt-numeric	uint32	Numeric equivalents for awt values. <ul style="list-style-type: none"> 0: Off 1: On

Table 24 debug-log-parameters properties (continued)

Name	Type	Description
res2	string	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
res2-numeric	uint32	Numeric equivalents for res2 values. <ul style="list-style-type: none"> 0: Off 1: On
capi2	string	Shows whether Internal Configuration API tracing messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
capi2-numeric	uint32	Numeric equivalents for capi2 values. <ul style="list-style-type: none"> 0: Off 1: On
dms	string	Shows whether Snapshot feature debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
dms-numeric	uint32	Numeric equivalents for dms values. <ul style="list-style-type: none"> 0: Off 1: On
fruid	string	Shows whether FRU ID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
fruid-numeric	uint32	Numeric equivalents for fruid values. <ul style="list-style-type: none"> 0: Off 1: On
resmgr	string	Shows whether Reservation Manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
resmgr-numeric	uint32	Numeric equivalents for resmgr values. <ul style="list-style-type: none"> 0: Off 1: On
init	string	Not used.
init-numeric	uint32	Not used.
ps	string	Shows whether paged storage debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled.
ps-numeric	uint32	Numeric equivalents for ps values. <ul style="list-style-type: none"> 0: Off 1: On

Table 24 debug-log-parameters properties (continued)

Name	Type	Description
hb	string	Not used.
hb-numeric	uint32	Not used.

disk-groups

This basetype is used by [show configuration](#), [show disk-groups](#), and [show pools](#).

Table 25 disk-groups properties

Name	Type	Description
name	string	The name of the disk group.
size	uint64	The capacity of the disk group, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
freespace	uint64	The amount of free space in the disk group, formatted to use the current base, precision, and units.
freespace-numeric	uint32	Unformatted freespace value in 512-byte blocks.
raw-size	string	The raw capacity of the disks in the disk group, irrespective of space reserved for RAID overhead and so forth, formatted to use the current base, precision, and units.
raw-size-numeric	uint64	Unformatted raw-size value in 512-byte blocks.
storage-type	string	<ul style="list-style-type: none">Linear: The disk group acts as a linear pool.Virtual: The disk group is in a virtual pool.
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none">0: Linear1: Virtual
pool	string	The name of the pool that contains the disk group.
pool-serial-number	string	The serial number of the pool that contains the disk group.
storage-tier	string	<ul style="list-style-type: none">Archive: The disk group is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).Performance: The disk group is in the highest storage tier, which uses SSDs (high speed, low capacity).Read Cache: The disk is an SSD providing high-speed read cache for a storage pool.Standard: The disk group is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
storage-tier-numeric	uint32	Numeric equivalents for storage-tier values. <ul style="list-style-type: none">0: N/A1: Performance2: Standard4: Archive8: Read Cache
total-pages	uint32	For a virtual disk group, the total number of 4-MB pages it contains. For a linear disk group, 0.
allocated-pages	uint32	For a virtual pool, the number of 4-MB pages that are currently in use. For a linear pool, 0.
available-pages	uint32	For a virtual pool, the number of 4-MB pages that are still available to be allocated. For a linear pool, 0.
pool-percentage	uint8	The percentage of pool capacity that the disk group occupies.
performance-rank	uint8	Disk group performance rank within the virtual pool.

Table 25 disk-groups properties (continued)

Name	Type	Description
owner	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> • 0: B • 1: A
preferred-owner	string	Controller that owns the disk group and its volumes during normal operation. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
preferred-owner-numeric	uint32	Numeric equivalents for preferred owner values. <ul style="list-style-type: none"> • 0: B • 1: A
raidtype	string	The RAID level of the disk group. <ul style="list-style-type: none"> • NRAID • RAID0 • RAID1 • RAID3 • RAID5 • RAID6 • RAID10 • RAID50
raidtype-numeric	uint32	Numeric equivalents for raidtype values. <ul style="list-style-type: none"> • 0: RAID0 • 1: RAID1 • 3: RAID3 • 5: RAID5 • 6: NRAID • 8: RAID50 • 10: RAID10 • 11: RAID6
diskcount	uint16	Number of disks in the disk group.
sparecount	uint16	Number of spare disks assigned to the disk group.
chunksize	string	<ul style="list-style-type: none"> • For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the disk group. • For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A). • For RAID 50, the disk-group chunk size calculated as: <i>configured-chunk-size</i> x (<i>subgroup-members</i> - 1). For a disk group configured to use 32-KB chunk size and 4-disk subgroups, the value would be 96k (32KB x 3).

Table 25 disk-groups properties (continued)

Name	Type	Description
status	string	<ul style="list-style-type: none"> • CRIT: Critical. The disk group is online but isn't fault tolerant because some of its disks are down. • DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged. • FTDN: Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down. • FTOL: Fault tolerant and online. • MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing. • OFFL: Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost. • QTCR: Quarantined critical. The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined. • QTDN: Quarantined with a down disk. The RAID-6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined. • QTOF: Quarantined offline. The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 disk group. • STOP: The disk group is stopped. • UNKN: Unknown. • UP: Up. The disk group is online and does not have fault-tolerant attributes.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: FTOL • 1: FTDN • 2: CRIT • 3: OFFL • 4: QTCR • 5: QTOF • 6: QTDN • 7: STOP • 8: MSNG • 9: DMGD • 250: UP • <i>other</i>: UNKN
lun	uint32	Not used.
min-drive-size	uint64	Minimum disk size that can this vdisk can use, formatted to use the current base, precision, and units.
min-drive-size-numeric	uint32	Numeric equivalents for min-drive-size values.
create-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the vdisk was created.
create-date-numeric	uint32	Unformatted create-date value.
cache-read-ahead	string	The read-ahead size, formatted to use the current base, precision, and units.
cache-read-ahead-numeric	uint64	Unformatted cache-read-ahead value in 512-byte blocks.

Table 25 disk-groups properties (continued)

Name	Type	Description
cache-flush-period	uint32	Not used.
read-ahead-enabled	string	Shows whether read-ahead cache is enabled or disabled. <ul style="list-style-type: none"> • Disabled • Enabled
read-ahead-enabled-numeric	uint32	Numeric equivalents for read-ahead-enabled values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
write-back-enabled	string	Shows the current, system-wide cache policy as determined by auto-write-through logic. <ul style="list-style-type: none"> • Disabled • Enabled
write-back-enabled-numeric	uint32	Numeric equivalents for write-back-enabled values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
job-running	string	Same as current-job.
current-job	string	Job running on the disk group, if any. <ul style="list-style-type: none"> • CPYBK: The disk group is being used in a copyback operation. • DRSC: A disk is being scrubbed. • EXPD: The disk group is being expanded. • INIT: The disk group is initializing. • RCON: The disk group is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The disk group is being verified. • VRSC: The disk group is being scrubbed. • Blank if no job is running.
current-job-numeric	uint32	Numeric equivalents for current-job values. <ul style="list-style-type: none"> • 0: (blank) • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC • 9: VREMV • 11: CPYBK • 12: VPREP • 13: VDRAIN • 14: VRECV
current-job-completion	string	<ul style="list-style-type: none"> • 0%–99%: Percent complete of running job. • (blank): No job is running (job has completed).

Table 25 disk-groups properties (continued)

Name	Type	Description
num-array-partitions	uint32	Number of volumes in the disk group.
largest-free-partition-space	uint64	The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.
largest-free-partition-space-numeric	uint32	Unformatted largest-free-partition-space value in 512-byte blocks.
num-drives-per-low-level-array	uint8	<ul style="list-style-type: none"> For a RAID-10 or RAID-50 disk group, the number of disks in each subgroup. For other RAID levels, 1.
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.
new-partition-lba	uint64	Maximum number of 512-byte blocks that could be allocated to a newly created volume. The value is formatted to use the current base, precision, and units. Expanding a volume in the same disk group will reduce this amount.
new-partition-lba-numeric	uint32	Unformatted new-partition-lba value in 512-byte blocks.
array-drive-type	string	Type of disks used in the disk group. <ul style="list-style-type: none"> SAS: Enterprise SAS. SAS MDL: Midline SAS. sSAS: SAS SSD. MIX: Mixture of enterprise SAS and midline SAS disks.
array-drive-type-numeric	uint32	Numeric equivalents for array-drive-type values. <ul style="list-style-type: none"> 1: MIX 4: SAS 8: sSAS 11: SAS MDL
is-job-auto-abortable	string	<ul style="list-style-type: none"> false: The current job must be manually aborted before you can delete the disk group. true: The current job will automatically abort if you delete the disk group.
is-job-auto-abortable-numeric	uint32	Numeric equivalents for is-job-auto-abortable values. <ul style="list-style-type: none"> 0: false 1: true
serial-number	string	Disk group serial number.
blocks	uint64	Unformatted size value in 512-byte blocks.
disk-dsd-enable-vdisk	string	<ul style="list-style-type: none"> Disabled: DSD is disabled for the disk group. Enabled - all spinning: DSD is enabled for the disk group. Partial spin-down: DSD is enabled for the disk group and its disks are partially spun down to conserve power. Full spin-down: DSD is enabled for the disk group and its disks are fully spun down to conserve power.

Table 25 disk-groups properties (continued)

Name	Type	Description
disk-dsd-enable-vdisk-numeric	uint32	Numeric equivalents for disk-dsd-enable-vdisk values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled - all spinning • 2: Partial spin-down • 3: Full spin-down
disk-dsd-delay-vdisk	uint32	The period of inactivity after which the disk group's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.
scrub-duration-goal	uint16	Not applicable.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component	Embedded; see unhealthy-component .	

disk-group-statistics

This basetype is used by [show disk-group-statistics](#).

Table 26 disk-group-statistics properties

Name	Type	Description
serial-number	string	The serial number of the disk group.
name	string	The name of the disk group.
time-since-reset	uint32	The amount of time, in milliseconds, since these statistics were last reset, either by a user or by a controller restart.
time-since-sample	uint32	The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.
number-of-reads	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
bytes-per-second	uint64	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	uint32	Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.
disk-group-statistics-paged	Embedded; see disk-group-statistics-paged .	

disk-group-statistics-paged

This basetype is used by `show disk-group-statistics` for a virtual disk group.

Table 27 disk-group-statistics-paged properties

Name	Type	Description
pages-alloc-per-minute	uint32	The rate, in pages per minute, at which pages are allocated to volumes in the disk group because they need more space to store data.
pages-dealloc-per-minute	uint32	The rate, in pages per minute, at which pages are deallocated from volumes in the disk group because they no longer need the space to store data.
pages-reclaimed	uint32	The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).
num-pages-unmap-per-minute	uint32	The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI unmap command, to free storage space as a result of deleting files or formatting volumes on the host.

disk-hist-statistics

This basetype is used by [show disk-statistics](#) when the `historical` parameter is specified.

Table 28 disk-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	Total number of read and write operations since the last sampling time.
number-of-reads	uint64	Number of read operations since the last sampling time.
number-of-writes	uint64	Number of write operations since the last sampling time.
total-data-transferred	uint64	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted <code>total-data-transferred</code> value.
data-read	uint64	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted <code>data-read</code> value.
data-written	uint64	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted <code>data-written</code> value.
total-iops	uint64	Total number of read and write operations per second since the last sampling time.
read-iops	uint64	Number of read operations per second since the last sampling time.
write-iops	uint64	Number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	Total data transfer rate, in bytes per second, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted <code>total-bytes-per-second</code> value.
read-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted <code>read-bytes-per-second</code> value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted <code>write-bytes-per-second</code> value.
queue-depth	uint64	Average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.
avg-rsp-time	uint64	Average response time, in microseconds, for read and write operations since the last sampling time.
avg-read-rsp-time	uint64	Average response time, in microseconds, for read operations since the last sampling time.
avg-write-rsp-time	uint64	Average response time, in microseconds, for write operations since the last sampling time.
avg-io-size	uint64	Average data size of read and write operations since the last sampling time.
avg-io-size-numeric	uint64	Unformatted <code>avg-io-size</code> value.

Table 28 disk-hist-statistics properties (continued)

Name	Type	Description
avg-read-io-size	uint64	Average data size of read operations since the last sampling time.
avg-read-io-size-numeric	uint64	Unformatted avg-read-io-size value.
avg-write-io-size	uint64	Average data size of write operations since the last sampling time.
avg-write-io-size-numeric	uint64	Unformatted avg-write-io-size value.
number-of-disk-errors	uint64	Total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.

disk-statistics

This basetype is used by [show disk-statistics](#) when the `historical` parameter is omitted.

Table 29 disk-statistics properties

Name	Type	Description
<code>durable-id</code>	string	Disk ID in the form <code>disk_enclosure-number.disk-number</code> .
<code>serial-number</code>	string	Disk serial number.
<code>bytes-per-second</code>	uint64	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
<code>bytes-per-second-numeric</code>	uint64	Unformatted <code>bytes-per-second</code> value.
<code>iops</code>	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
<code>number-of-reads</code>	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.
<code>number-of-writes</code>	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
<code>data-read</code>	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
<code>data-read-numeric</code>	uint64	Unformatted <code>data-read</code> value.
<code>data-written</code>	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
<code>data-written-numeric</code>	uint64	Unformatted <code>data-written</code> value.
<code>queue-depth</code>	uint32	Number of pending I/O operations currently being serviced.
<code>reset-time</code>	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when these statistics were last reset, either by a user or by a controller restart.
<code>reset-time-numeric</code>	uint32	Unformatted <code>reset-time</code> value.
<code>start-sample-time</code>	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.
<code>start-sample-time-numeric</code>	uint32	Unformatted <code>start-sample-time</code> value.
<code>stop-sample-time</code>	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
<code>stop-sample-time-numeric</code>	uint32	Unformatted <code>stop-sample-time</code> value.
<code>smart-count-1</code>	uint32	For port 1, the number of SMART events recorded.
<code>io-timeout-count-1</code>	uint32	For port 1, the number of timeouts accessing the disk.
<code>no-response-count-1</code>	uint32	For port 1, the number of times the disk did not respond.
<code>spinup-retry-count-1</code>	uint32	For port 1, the number of attempts by the storage system to spin up the disk.

Table 29 disk-statistics properties (continued)

Name	Type	Description
number-of-media-errors-1	uint32	For port 1, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-nonmedia-errors-1	uint32	For port 1, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-block-reassigns-1	uint32	For port 1, the number of times blocks were reassigned to alternate locations.
number-of-bad-blocks-1	uint32	For port 1, the number of bad blocks encountered.
smart-count-2	uint32	For port 2, the number of pending I/O operations currently being serviced.
io-timeout-count-2	uint32	For port 2, the number of SMART events recorded.
no-response-count-2	uint32	For port 2, the number of timeouts accessing the disk.
spinup-retry-count-2	uint32	For port 2, the number of times the disk did not respond.
number-of-media-errors-2	uint32	For port 2, the number of attempts by the storage system to spin up the disk.
number-of-nonmedia-errors-2	uint32	For port 2, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-block-reassigns-2	uint32	For port 2, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-bad-blocks-2	uint32	For port 2, the number of times blocks were reassigned to alternate locations.

drawer-sensors

This basetype is used by [show sensor-status](#).

Table 30 drawer-sensors properties

Name	Type	Description
durable-id	string	Sensor ID. For example: <i>sensor_temp_drawer-ID.sensor-number</i> .
drawer-id	uint32	<ul style="list-style-type: none"> 0: Left 1: Middle 2: Right
sensor-name	string	Sensor name and location.
value	string	<ul style="list-style-type: none"> For a sensor, its value. For overall unit status, one of the status values below.
status	string	<ul style="list-style-type: none"> Ok: The sensor is present and detects no error condition. Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds. Error: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold. Unavailable: The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup. Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor. Unknown: The sensor is present but status is not available. Not Installed: The sensor is not present. Unsupported: Status detection is not implemented.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Unsupported 1: Ok 2: Error 3: Warning 4: Unrecoverable 5: Not Installed 6: Unknown 7: Unavailable
sensor-location	uint32	Sensor location in a drawer. <ul style="list-style-type: none"> 1: Unknown 2: Overall drawer status 5: Power supply unit 7: Enclosure 8: On board
sensor-type	uint32	Sensor type in a drawer: <ul style="list-style-type: none"> 2: Overall drawer status 3: Temperature 6: Capacitor charge 9: Voltage

drawers

This basetype is used by [show enclosures](#).

Table 31 drawers properties

Name	Type	Description
drawable-id	string	Drawer ID in the form <code>drawer_number</code> .
drawer-id	uint8	<ul style="list-style-type: none"> 0: Left 1: Middle 2: Right
drawer-wwn	string	Drawer WWN.
name	string	Drawer name.
rows	uint8	Number of rows of disk slots.
columns	uint8	Number of columns of disk slots.
slots	uint8	Number of disk slots in drawer.
number-of-disks	uint8	Number of disk slots (not installed disks) in drawer.
emp-a-busid	string	SCSI channel ID of the Enclosure Management Processor (EMP) A in a drawer's Expander Controller.
emp-a-targetid	string	SCSI target ID of the Enclosure Management Processor (EMP) A in a drawer's Expander Controller.
emp-a-rev	string	Firmware revision for the Enclosure Management Processor (EMP) A in a drawer's Expander Controller.
emp-b-busid	string	SCSI channel ID of the Enclosure Management Processor (EMP) B in a drawer's Expander Controller.
emp-b-targetid	string	SCSI target ID of the Enclosure Management Processor (EMP) B in a drawer's Expander Controller.
emp-b-rev	string	Firmware revision for the Enclosure Management Processor (EMP) B in a drawer's Expander Controller.
emp-a	string	Shows the field name EMP A in console format.
emp-a-ch-id-rev	string	Channel ID and firmware revision of the Enclosure Management Processor A in a drawer's Expander Controller
emp-b	string	Shows the field name EMP B in console format.
emp-b-ch-id-rev	string	Channel ID and firmware revision of the Enclosure Management Processor B in a drawer's Expander Controller
locator-led	string	Shows the state of the locator LED on a drawer: <ul style="list-style-type: none"> Off On
locator-led-numeric	uint32	Numeric equivalents for the <code>locator-led</code> property: <ul style="list-style-type: none"> 0: Off 1: On
status	string	Drawer status: <ul style="list-style-type: none"> Up Error Warning Not Present Unknown Unavailable

Table 31 drawers properties (continued)

Name	Type	Description
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> • 1: Up • 2: Error • 3: Warning • 5: Not Present • 6: Unknown • 7: Unavailable
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component	Embedded; see unhealthy-component .	

drive-parameters

This basetype is used by [show disk-parameters](#).

Table 32 drive-parameters properties

Name	Type	Description
smart	string	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none">• Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system.• Enabled: SMART is enabled for all disks in the system and will be enabled for new disks added to the system.• Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.
smart-numeric	uint32	Numeric equivalents for smart values. <ul style="list-style-type: none">• 0: Detect-Only• 1: Enabled• 2: Disabled
drive-write-back-cache	string	<ul style="list-style-type: none">• Disabled: Disk write-back cache is disabled for all disks in the system and will be enabled for new disks added to the system. This parameter cannot be changed.
drive-write-back-cache-numeric	uint32	Numeric equivalents for drive-write-back-cache values. <ul style="list-style-type: none">• 0: Detect-Only• 1: Enabled• 2: Disabled
drive-timeout-retry-max	uint8	Maximum number of times a timed-out I/O operation can be retried before the operation is failed.
drive-attempt-timeout	uint8	Number of seconds before an I/O operation is aborted and possibly retried.
drive-overall-timeout	uint8	Total time in seconds before an I/O operation is failed regardless of the drive-attempt-timeout and drive-timeout-retry-max settings.
disk-dsd-enable	string	Shows whether available disks and global spares will spin down after a period of inactivity shown by the disk-dsd-delay property. <ul style="list-style-type: none">• Disabled: Drive spin down for available disks and global spares is disabled.• Enabled: Drive spin down for available disks and global spares is enabled.
disk-dsd-enable-numeric	uint32	Numeric equivalents for disk-dsd-enable values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
disk-dsd-enable-pool	string	Not applicable.
disk-dsd-delay	uint16	Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.

drive-summary

This basetype is used by [show disk-statistics](#) when the `historical` parameter is specified.

Table 33 drive-summary properties

Name	Type	Description
<code>durable-id</code>	string	Disk ID in the form <code>disk_enclosure-number.disk-number</code> .
<code>serial-number</code>	string	Disk serial number.
<code>disk-hist-statistics</code>		Embedded; see disk-hist-statistics .

drives

This basetype is used by [show configuration](#) and [show disks](#).

Table 34 drives properties

Name	Type	Description
durable-id	string	Disk ID in the form <code>disk_enclosure-ID.slot-number</code> .
enclosure-id	uint32	Enclosure ID.
drawer-id	uint8	<ul style="list-style-type: none"> 0: Left 1: Middle 2: Right
slot	uint32	Disk slot number.
location	string	Disk's enclosure ID and slot number.
port	uint32	For internal use only.
scsi-id	uint32	SCSI ID assigned to this disk for the primary channel.
blocks	uint64	Unformatted size value in 512-byte blocks.
serial-number	string	Disk serial number.
vendor	string	Disk vendor.
model	string	Disk model.
revision	string	Disk firmware revision level.
secondary-channel	uint32	SCSI ID assigned to this disk for the secondary channel.
container-index	uint32	Container index.
member-index	uint32	Index for this disk in the vdisk list.
description	string	Disk description. <ul style="list-style-type: none"> SAS: Enterprise SAS. SAS MDL: Midline SAS. sSAS: SAS SSD.
description-numeric	uint32	Numeric equivalents for description values. <ul style="list-style-type: none"> 4: SAS 8: sSAS 11: SAS MDL
architecture	string	Disk architecture. <ul style="list-style-type: none"> HDD SSD
architecture-numeric	uint32	Numeric equivalents for architecture values. <ul style="list-style-type: none"> 0: SSD 1: HDD
interface	string	Disk interface. <ul style="list-style-type: none"> SAS
interface-numeric	uint32	Numeric equivalents for interface values. <ul style="list-style-type: none"> 0: SAS
single-ported	string	<ul style="list-style-type: none"> Disabled: The disk has a dual-port connection to the midplane. Enabled: The disk has a single-port connection to the midplane.

Table 34 drives properties (continued)

Name	Type	Description
single-ported-numeric	uint32	Numeric equivalents for single-ported values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
type	string	Type of disk. <ul style="list-style-type: none"> SAS: Enterprise SAS. SAS MDL: Midline SAS. sSAS: SAS SSD.
type-numeric	uint32	Numeric equivalents for type values. <ul style="list-style-type: none"> 4: SAS 8: sSAS 11: SAS MDL
usage	string	Shows the disk's usage. <ul style="list-style-type: none"> AVAIL: The disk is available. DEDICATED SP: The disk is a spare assigned to a linear disk group. FAILED: The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk. GLOBAL SP: The disk is a global spare. LEFTOVR: The disk is a leftover. LINEAR POOL: The disk is a member of a vdisk. UNUSABLE: The disk cannot be used in a disk group because the system is secured because the disk is locked to data access. VDISK: The disk is a member of a vdisk. VDISK SP: The disk is a spare assigned to a vdisk. VIRTUAL POOL: The disk is a member of a disk group in a storage pool.
usage-numeric	uint32	Numeric equivalents for usage values. <ul style="list-style-type: none"> 0: AVAIL 1: VDISK or LINEAR POOL 2: VDISK SP or DEDICATED SP 3: GLOBAL SP 5: LEFTOVR 7: FAILED8: UNUSABLE 9: VIRTUAL POOL
job-running	string	Job running on the disk, if any. <ul style="list-style-type: none"> (blank): None. CPYBK: The disk group is being used in a copyback operation. DRSC: The disk group is being scrubbed. EXPD: The disk group is being expanded. INIT: The disk group is being initialized. RCON: The disk group is being reconstructed. VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. VPREP: The virtual disk group is being prepared for use in a virtual pool. VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. VREMV: The disk group and its data are being removed. VERFY: The disk group is being verified. VRSC: The disk group is being scrubbed.

Table 34 drives properties (continued)

Name	Type	Description
job-running-numeric	uint32	Numeric equivalents for job-running values. <ul style="list-style-type: none"> 0: None 2: INIT 3: RCON 4: VRFY 5: EXPD 6: VRSC 7: DRSC 9: VREMV 11: CPYBK 12: VPREP 13: VDRAIN 14: VRECV
state	string	Shows the disk's usage value.
current-job-completion	string	<ul style="list-style-type: none"> 0%–99%: Percent complete of running job. (blank): No job is running (job has completed).
blink	uint32	Deprecated; locator LED status now shown by locator-led property.
locator-led	uint32	<ul style="list-style-type: none"> 0: The disk's locator LED is not illuminated. 1: The disk's locator LED is illuminated.
speed	uint32	Not used.
smart	string	<ul style="list-style-type: none"> Disabled: SMART is disabled for this disk. Enabled: SMART is enabled for this disk.
smart-numeric	string	Numeric equivalents for smart values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
dual-port	uint32	<ul style="list-style-type: none"> 0: Single-ported disk. 1: Dual-ported disk.
error	uint32	Not used.
fc-p1-channel	uint32	Port 1 channel ID.
fc-p1-device-id	uint32	Port 1 device ID.
fc-p1-node-wwn	string	Port 1 WWNN.
fc-p1-port-wwn	string	Port 1 WWPN.
fc-p1-unit-number	uint32	Port 1 unit number.
fc-p2-channel	uint32	Port 2 channel number.
fc-p2-device-id	uint32	Port 2 device ID.
fc-p2-node-wwn	string	Port 2 WWNN.
fc-p2-port-wwn	string	Port 2 WWPN.
fc-p2-unit-number	uint32	Port 2 unit number.
drive-down-code	uint8	Numeric code indicating why the disk is down.

Table 34 drives properties (continued)

Name	Type	Description
owner	string	Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> A: Controller A. B: Controller B.
owner-numeric	string	Numeric equivalents for owner values. <ul style="list-style-type: none"> 0: B 1: A
index	uint32	For internal use only.
rpm	uint32	The speed of a spinning disk, in thousands of revolutions per minute, as specified by the disk vendor. For an SSD, 0 is shown.
size	string	Disk capacity, formatted to use the current base, precision, and units.
size-numeric	string	Unformatted size value in 512-byte blocks.
transfer-rate	string	Disk data transfer rate in Gbit/s. It is normal behavior for the rate to vary. <ul style="list-style-type: none"> 1.5 3.0 6.0 <p>Some 6-Gbit/s disks might not consistently support a 6-Gbit/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3 Gbit/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.</p>
transfer-rate-numeric	uint32	For internal use only.
attributes	string	Shows which controller a single-ported disk is connected to. <ul style="list-style-type: none"> A: Controller A. B: Controller B.
attributes-numeric	uint32	For internal use only.
enclosure-wwn	string	Enclosure WWN.
status	string	Disk status. <ul style="list-style-type: none"> Up: The disk is present and is properly communicating with the expander. Spun Down: The disk is present and has been spun down by the drive spin down feature. Warning: The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in Error status. Error: The disk is present but is not detected by the expander. Unknown: Initial status when the disk is first detected or powered on. Not Present: The disk slot indicates that no disk is present. Unrecoverable: The disk is present but has unrecoverable errors. Unavailable: The disk is present but cannot communicate with the expander. Unsupported: The disk is present but is an unsupported type.
recon-state	string	The state of the disk (source or destination) if it is involved in a reconstruct operation. <ul style="list-style-type: none"> From: This disk is being used as the source of a reconstruct operation. To: This disk is being used as the target of a reconstruct operation. N/A: This disk is not being used in a reconstruct operation.

Table 34 drives properties (continued)

Name	Type	Description
recon-state-numeric	uint32	Numeric equivalents for recon-state values. <ul style="list-style-type: none"> 0: N/A 1: From 2: To
copyback-state	string	The state of the disk (source or destination) if it is involved in a copyback operation. <ul style="list-style-type: none"> From: This disk is being used as the source of a copyback operation. To: This disk is being used as the target of a copyback operation. N/A: This disk is not being used in a copyback operation.
copyback-state-numeric	uint32	Numeric equivalents for copyback-state values. <ul style="list-style-type: none"> 0: N/A 1: From 2: To
virtual-disk-serial	string	If the disk is in a vdisk, the vdisk name. Otherwise, blank.
disk-group	string	If the disk is in a disk group, the disk group name. Otherwise, blank.
storage-pool-name	string	If the disk is in a pool, the pool name. Otherwise, blank.
storage-tier	string	<ul style="list-style-type: none"> Archive: The disk is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity). N/A: Not applicable. Performance: The disk is in the highest storage tier, which uses SSDs (high speed, low capacity). Read Cache: The disk is an SSD providing high-speed read cache for a storage pool. Standard: The disk is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
storage-tier-numeric	uint32	Numeric equivalents for storage-tier values. <ul style="list-style-type: none"> 0: N/A 1: Performance 2: Standard 4: Archive 8: Read Cache
ssd-life-left	string	<ul style="list-style-type: none"> 100%-0%: For an SSD, this field shows the percentage of disk life remaining. When the value decreases to 20%, event 502 is logged with Informational severity. Event 502 is logged again with Warning severity when the value decreases to 5%, 2%, and 0%. N/A: The disk is not an SSD.
ssd-life-left-numeric	uint32	Numeric equivalents for ssd-life-left values. <ul style="list-style-type: none"> 0-100 255: N/A
led-status	string	Disk LED status. <ul style="list-style-type: none"> Rebuild: The disk's vdisk is being reconstructed. Fault: The disk has a fault. ID: The locator LED is illuminated to identify the disk. Remove: The disk is ready to be removed from the enclosure. Blank if the disk is not part of a vdisk or is spun down.

Table 34 drives properties (continued)

Name	Type	Description
led-status-numeric	string	Numeric equivalents for led-status values. <ul style="list-style-type: none"> • 1: Online • 2: Rebuild • 4: Fault • 8: Pred Fail • 16: ID • 32: Remove
disk-dsd-count	uint32	Number of times the DSD feature has spun down this disk.
spun-down	uint32	Shows whether the disk is spun down by the DSD feature. <ul style="list-style-type: none"> • 0: Not spun down. • 1: Spun down.
number-of-ios	uint64	Total number of I/O operations (reads and writes).
total-data-transferred	uint64	Total bytes transferred.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
avg-rsp-time	uint64	Average I/O response time in microseconds.
fde-state	string	The FDE state of the disk. <ul style="list-style-type: none"> • Unknown: The FDE state is unknown. • Not FDE Capable: The disk is not FDE-capable. • Not Secured: The disk is not secured. • Secured, Unlocked: The system is secured and the disk is unlocked. • Secured, Locked: The system is secured and the disk is locked to data access, preventing its use. • FDE Protocol Failure: A temporary state that can occur while the system is securing the disk.
fde-state-numeric	uint32	Numeric equivalents for fde-state values. <ul style="list-style-type: none"> • 0: Not FDE Capable • 1: Not Secured • 2: Secured, Unlocked • 3: Secure, Locked • 4: FDE Protocol Failure • 5: Unknown
lock-key-id	string	Current lock ID.
import-lock-key-id	string	Import lock ID
fde-config-time	string	If the system is secured, the time at which the current lock ID was set in the format <i>year-month-day hour:minutes:seconds</i> (UTC).
fde-config-time-numeric	uint32	Unformatted fde-config-time value.
temperature	string	Temperature of the disk.
temperature-numeric	uint32	Numeric equivalent for the temperature value.

Table 34 drives properties (continued)

Name	Type	Description
temperature-status	string	<ul style="list-style-type: none"> • OK: The disk sensor is present and detects no error condition. • Warning: The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds. • Critical: The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold. • Unknown: The disk sensor is present but status is not available.
temperature-status-numeric	uint32	Numeric equivalents for temperature-status values. <ul style="list-style-type: none"> • 1: OK • 2: Critical • 3: Warning • other: Unknown
pi-formatted	string	Not supported.
pi-formatted-numeric	uint32	Not supported.
power-on-hours	uint32	The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.
health	string	Disk health. <ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

email-parameters

This basetype is used by [show email-parameters](#).

Table 35 email-parameters properties

Name	Type	Description
email-notification	string	Shows whether email (SMTP) notification of events is enabled. <ul style="list-style-type: none">• Disabled: Email notification is disabled.• Enabled: Email notification is enabled.
email-notification-numeric	uint32	Numeric equivalents for email-notification values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
email-notification-filter	string	The minimum severity for which the system should send notifications: <ul style="list-style-type: none">• crit: Sends notifications for Critical events only.• error: Sends notifications for Error and Critical events.• warn: Sends notifications for Warning, Error, and Critical events.• info: Sends notifications for all events.• none: Disables email notification. This parameter does not apply to managed-logs notifications.
email-notification-filter-numeric	uint32	Numeric equivalents for email-notification-filter values. <ul style="list-style-type: none">• 8: crit• 4: error• 2: warn• 1: info• 0: none
email-notify-address-1	string	Up to three email addresses for recipients of event notifications.
email-notify-address-2	string	
email-notify-address-3	string	
email-notify-address-4	string	Shows the email address for the log-collection system used by the log-management feature.
email-server	string	The IP address of the SMTP mail server to use for the email messages.
email-domain	string	The domain name that, with the sender name, forms the “from” address for remote notification.
email-sender	string	The sender name that, with the domain name, forms the “from” address for remote notification.
include-logs	string	Shows whether system log files will automatically be attached for email notification messages generated by the log-management feature. This is the “push” mode of log management.
include-logs-numeric	uint32	Numeric equivalents for include-logs values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled

enclosure-fru

This basetype is used by [show configuration](#) and [show frus](#).

Table 36 enclosure-fru properties

Name	Type	Description
name	string	FRU name. <ul style="list-style-type: none"> CHASSIS_MIDPLANE: Chassis and midplane circuit board RAID_IOM: Controller module BOD_IOM: Expansion module POWER_SUPPLY: Power supply module DRAWER: Enclosure disk drawer
description	string	FRU long description.
part-number	string	FRU part number.
serial-number	string	FRU serial number.
revision	string	FRU hardware revision level.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when a PCBA was programmed or a power supply module was manufactured.
mfg-date-numeric	uint32	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID (global manufacturing code) of the FRU manufacturer.
fru-location	string	Location of the FRU in the enclosure. <ul style="list-style-type: none"> MID-PLANE SLOT: Chassis midplane. UPPER IOM SLOT: Controller module or expansion module A. LOWER IOM SLOT: Controller module or expansion module B. LEFT PSU SLOT: Power supply module on the left, as viewed from the back. RIGHT PSU SLOT: Power supply module on the right, as viewed from the back. LEFT DRAWER SLOT: Drawer on the left, as viewed from the front. MIDDLE DRAWER SLOT: Drawer on the middle, as viewed from the front. RIGHT DRAWER SLOT: Drawer on the right, as viewed from the front.
configuration-serialnumber	string	Configuration serial number.
fru-status	string	FRU status. <ul style="list-style-type: none"> Absent: Component is not present. Fault: At least one subcomponent has a fault. Invalid Data: For a power supply module, the EEPROM is improperly programmed. OK: All subcomponents are operating normally. Not Available: Status is not available.
original-serialnumber	string	For a power supply module, the original manufacturer serial number. Otherwise, N/A.
original-partnumber	string	For a power supply module, the original manufacturer part number. Otherwise, N/A.

Table 36 enclosure-fru properties (continued)

Name	Type	Description
original-revision	string	For a power supply module, the original manufacturer hardware revision. Otherwise, N/A.
enclosure-id	uint32	Enclosure ID.

enclosure-list

This basetype is used by [show configuration](#), and by [show disks](#) when the `enc1` parameter is specified.

Table 37 enclosure-list properties

Name	Type	Description
<code>status</code>	<code>string</code>	Disk slot status. <ul style="list-style-type: none">• <code>Up</code>: The disk is present and is properly communicating with the expander.• <code>Spun Down</code>: The disk is present and has been spun down by the drive spin down feature.• <code>Warning</code>: The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in <code>Error</code> status.• <code>Error</code>: The disk is present but is not detected by the expander.• <code>Unknown</code>: Initial status when the disk is first detected or powered on.• <code>Not Present</code>: The disk slot indicates that no disk is present.• <code>Unrecoverable</code>: The disk is present but has unrecoverable errors.• <code>Unavailable</code>: The disk is present but cannot communicate with the expander.• <code>Unsupported</code>: The disk is present but is an unsupported type.
<code>status-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Unsupported</code>• <code>1</code>: <code>Up</code>• <code>2</code>: <code>Error</code>• <code>3</code>: <code>Warning</code>• <code>4</code>: <code>Unrecoverable</code>• <code>5</code>: <code>Not Present</code>• <code>6</code>: <code>Unknown</code>• <code>7</code>: <code>Unavailable</code>• <code>20</code>: <code>Spun Down</code>
<code>enclosure-id</code>	<code>uint32</code>	Enclosure ID.
<code>slot</code>	<code>uint32</code>	Disk slot number.
<code>vendor</code>	<code>string</code>	Disk vendor.
<code>model</code>	<code>string</code>	Disk model.
<code>serial-number</code>	<code>string</code>	Disk serial number.
<code>size</code>	<code>string</code>	Disk capacity, formatted to use the current base, precision, and units.
<code>size-numeric</code>	<code>uint32</code>	Unformatted <code>size</code> value in 512-byte blocks.

enclosures

This basetype is used by [show configuration](#) and [show enclosures](#).

Table 38 enclosures properties

Name	Type	Description
durable-id	string	Enclosure ID in the form <code>enclosure_number</code> .
enclosure-id	uint8	Enclosure ID.
enclosure-wwn	string	Enclosure WWN.
name	string	Enclosure name.
location	string	Enclosure location, or blank if not set.
rack-number	uint8	Number of the rack that contains the enclosure.
rack-position	uint8	Position of the enclosure in the rack.
number-of-coolings-elements	uint8	Number of fan units in the enclosure.
number-of-disks	uint8	Number of disk slots (not installed disks) in the enclosure.
number-of-power-supplies	uint8	Number of power supplies in the enclosure.
status	string	Disk slot status. <ul style="list-style-type: none"> Unsupported Up Error Warning Unrecoverable Not Present Unknown Unavailable Spun Down
status-numeric	uint32	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none"> 0: Unsupported 1: Up 2: Error 3: Warning 4: Unrecoverable 5: Not Present 6: Unknown 7: Unavailable 20: Spun Down
midplane-serial-number	string	Midplane serial number.
vendor	string	Enclosure vendor.
model	string	Enclosure model.
fru-shortname	string	FRU short description.
fru-location	string	FRU location. <ul style="list-style-type: none"> MID-PLANE SLOT: Chassis midplane. (blank): Not applicable.

Table 38 enclosures properties (continued)

Name	Type	Description
part-number	string	FRU part number.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when a PCBA was programmed or a power supply module was manufactured.
mfg-date-numeric	string	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
description	string	FRU long description.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
emp-a-rev	string	Firmware revision of controller A's EMP.
emp-b-rev	string	Firmware revision of controller B's EMP.
rows	uint8	Number of rows of disk slots.
columns	uint8	Number of columns of disk slots.
slots	uint8	Number of disk slots in this enclosure
locator-led	string	Shows the state of the locator LED on an enclosure. <ul style="list-style-type: none"> • Off • On
locator-led-numeric	uint32	Numeric equivalents for locator-led values. <ul style="list-style-type: none"> • Off • On
drive-orientation	string	<ul style="list-style-type: none"> • vertical: Disks are oriented vertically. • horizontal: Disks are oriented horizontally.
drive-orientation-numeric	uint32	Numeric equivalents for drive-orientation values. <ul style="list-style-type: none"> • 0: vertical • 1: horizontal
enclosure-arrangement	string	<ul style="list-style-type: none"> • vertical: Disks are numbered vertically (by column from top to bottom, proceeding rightward). • horizontal: Disks are numbered horizontally (by row from left to right, proceeding downward).
enclosure-arrangement-numeric	uint32	Numeric equivalents for enclosure-arrangement values. <ul style="list-style-type: none"> • 0: vertical • 1: horizontal
emp-a-busid	string	SCSI channel ID of controller A's EMP.
emp-a-targetid	string	SCSI target ID of controller A's EMP.
emp-b-busid	string	SCSI channel ID of controller B's EMP.
emp-b-targetid	string	SCSI target ID of controller B's EMP.
emp-a	string	Shows the field name EMP A in console format.
emp-a-ch-id-rev	string	SCSI address and firmware revision of controller A's EMP.
emp-b	string	Shows the field name EMP B in console format.
emp-b-ch-id-rev	string	SCSI address and firmware revision of controller B's EMP.

Table 38 enclosures properties (continued)

Name	Type	Description
midplane-type	string	Enclosure midplane type. <ul style="list-style-type: none"> • 2U48-6G: Midplane for 2U, 48-disk enclosure with 6-Gbit/s maximum data rate to disks • 2U24-6Gv2: Midplane for 2U, reduced-depth, 24-disk enclosure with 6-Gbit/s maximum data rate to disks • 2U24-6G: Midplane for 2U, 24-disk enclosure with 6-Gbit/s maximum data rate to disks • 2U12-6Gv2: Midplane for 2U, reduced-depth, 12-disk enclosure with 6-Gbit/s maximum data rate to disks • 2U12-6G: Midplane for 2U, 12-disk enclosure with 6-Gbit/s maximum data rate to disks • N/A: Other type of midplane
midplane-type-numeric	uint32	Numeric equivalents for midplane-type values. <ul style="list-style-type: none"> • 0: 2U12-3G • 1: 2U24-3G • 2: 2U12-6G • 3: 2U24-6G • 5, 9, 13: 2U24-6Gv2 • 6, 10: 2U12-6Gv2 • 8: 2U48-6G
enclosure-power	string	Enclosure power in watts.
pcie2-capable	string	<ul style="list-style-type: none"> • False: Enclosure is not capable of using PCI Express version 2. • True: Enclosure is capable of using PCI Express version 2.
pcie2-capable-numeric	uint32	Numeric equivalents for pcie2-capable values. <ul style="list-style-type: none"> • 0: False • 1: True
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component		Embedded; see unhealthy-component .
drawer		Embedded; see drawers .
controllers		Embedded; see controllers , io-modules .
power-supplies		Embedded; see power-supplies .
fan-details		Embedded; see fan .

events

This basetype is used by [show events](#).

Table 39 events properties

Name	Type	Description
time-stamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when this event was detected.
time-stamp-numeric	uint32	Unformatted time-stamp value.
event-code	string	Event code. For event-code descriptions, see the Event Descriptions Reference Guide.
event-id	string	Event ID.
model	string	Controller model.
serial-number	string	Controller serial number.
controller	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none">• 0: B• 1: A
severity	string	Event severity. <ul style="list-style-type: none">• CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem <i>immediately</i>.• ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.• WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.• INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
severity-numeric	uint32	Numeric equivalents for severity values. <ul style="list-style-type: none">• 0: INFORMATIONAL• 1: WARNING• 2: ERROR• 3: CRITICAL
message	string	Brief description of the event that occurred. For some events, the message includes data about affected components.
additional-information	string	Shows additional information, if available, about the event.
recommended-action	string	Recommends actions to take, if any, to resolve the issue reported by the event.

eventsLogs

This basetype is used by [show events](#) when the `logs` parameter is specified.

Table 40 eventsLogs properties

Name	Type	Description
event-id	string	Event ID prefaced by A or B to identify the controller that logged the event.
time-stamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when this event was detected.
time-stamp-numeric	string	Unformatted <code>time-stamp</code> value.
event-code	string	Event code identifying the type of event to help diagnose problems.
severity	string	Event severity. <ul style="list-style-type: none">• CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem immediately.• ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.• WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.• INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
severity-numeric	string	Numeric equivalents for <code>severity</code> values. <ul style="list-style-type: none">• 0: INFORMATIONAL• 1: WARNING• 2: ERROR• 3: CRITICAL
message	string	Message giving details about the event.

expander-ports

This basetype is used by [show sas-link-health](#).

Table 41 expander-ports properties

Name	Type	Description
durable-id	string	Expander port ID.
enclosure-id	uint32	Enclosure ID.
controller	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"> 0: B 1: A
name	string	<ul style="list-style-type: none"> Out Port: Egress (expansion) port on controller module or an expansion module. Can be connected to an ingress port in an expansion module. In Port: Ingress port on an expansion module. Can be connected to an egress (expansion) port in a controller module or an expansion module.
name-numeric	uint32	<ul style="list-style-type: none"> 2: In Port 3: Out Port
status	string	Expander port status. <ul style="list-style-type: none"> Up Warning Error Not Present Unknown Disconnected
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Up 1: Warning 2: Error 3: Not Present 4: Unknown 6: Disconnected
health	string	<ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

fan

This basetype is used by [show fans](#) and [show power-supplies](#).

Table 42 fan properties

Name	Type	Description
durable-id	string	Fan unit ID in the form <code>fan_enclosure-ID.fan-number</code> .
name	string	Fan unit name in the form <code>Fan loc:position-PSU power-supply-ID</code> . The position is as viewed from the back of the enclosure.
location	string	Fan location in the form <code>Enclosure enclosure-ID - position</code> . The position is as viewed from the back of the enclosure.
status	string	Fan unit status. <ul style="list-style-type: none"> • Up • Error • Off • Unknown
status-numeric	uint32	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none"> • 0: Up • 1: Error • 2: Off • 3: Unknown
speed	uint32	Fan speed (revolutions per minute).
position	string	Fan position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> • Left • Right
position-numeric	uint32	Numeric equivalents for <code>position</code> values. <ul style="list-style-type: none"> • 0: Left • 1: Right
serial-number	string	• (blank): Not applicable.
fw-revision	string	• (blank): Not applicable.
hw-revision	string	• (blank): Not applicable.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for <code>health</code> values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: N/A • 4: Unknown
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

fc-port

This basetype is used by `show ports` and `show host-parameters (Deprecated)` for a Fibre Channel port.

Table 43 fc-port properties

Name	Type	Description
configured-topology	string	Configured topology. <ul style="list-style-type: none">• Loop: Fibre Channel arbitrated loop (public or private).• PTP: Fibre Channel point-to-point.• Auto: Loop preferred, otherwise point-to-point, based on the detected connection type.
primary-loop-id	string	If the port is using loop topology and the port status is Up, this field shows the primary loop ID. If the port is not using loop topology or the port status is not Up, this field shows N/A.
sfp-status	string	SFP status: <ul style="list-style-type: none">• OK• Not present: No SFP is inserted in this port.• Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.• Incorrect protocol: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.
sfp-present	string	Shows whether the port contains an SFP. <ul style="list-style-type: none">• Not Present• Present
sfp-present-numeric	uint32	Numeric equivalents for sfp-present values. <ul style="list-style-type: none">• 0: Not Present• 1: Present
sfp-vendor	string	The SFP vendor.
sfp-part-number	string	The SFP part number.
sfp-revision	string	The SFP revision.
sfp-supported-speeds	string	The link speeds that the SFP supports.

fde-state

This basetype is used by [show fde-state](#).

Table 44 fde-state properties

Name	Type	Description
fde-security-status	string	Shows whether the system is secured or unsecured: <ul style="list-style-type: none">• Unsecured: The system has not been secured with a passphrase.• Secured: The system has been secured with a passphrase.• Secured, Lock Ready: The system has been secured and lock keys are clear. The system will become locked after the next power cycle.• Secured, Locked: The system is secured and the disks are locked to data access, preventing their use.
fde-security-status-numeric	uint32	Numeric equivalents for fde-security-status values. <ul style="list-style-type: none">• 1: Unsecured• 2: Secured• 3: Secured, Lock Ready• 4: Secured, Locked
lock-key-id	string	Current lock ID.
import-lock-key-id	string	Import lock ID.
fde-config-time	string	If the system is secured, the time at which the current lock ID was set in the format <i>year-month-day hour:minutes:seconds</i> (UTC).
fde-config-time-numeric	uint32	Unformatted fde-config-time value.

host

This basetype is used by [show host-groups](#).

Table 45 host properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Host ID.
<code>name</code>	<code>string</code>	The name of the host.
<code>serial-number</code>	<code>string</code>	The serial number of the host.
<code>member-count</code>	<code>uint32</code>	The number of initiators in the host.
<code>host-group</code>	<code>string</code>	If the host is a member of a host group, the serial number of the host group. Otherwise, UNGROUPEDHOSTS.
<code>group-key</code>	<code>string</code>	If the host is a member of a host group, the durable ID of the host group. Otherwise, HGU.
<code>initiator</code>	Embedded; see initiator .	

host-group

This basetype is used by [show host-groups](#).

Table 46 host-group properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Host group ID.
<code>name</code>	<code>string</code>	The name of the host group.
<code>serial-number</code>	<code>string</code>	The serial number of the host group.
<code>member-count</code>	<code>uint32</code>	The number of hosts in the host group.
<code>host</code>	Embedded; see host .	

host-group-view

This basetype is used by [show maps](#) when the `initiator` parameter is specified.

Table 47 host-group-view properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Host group ID.
<code>serial-number</code>	<code>string</code>	The serial number of the host group.
<code>group-name</code>	<code>string</code>	The name of the host group in the format <i>host-group.*.*</i> , where the first <i>*</i> represents all hosts in the group and the second <i>*</i> represents all initiators in those hosts.
<code>host-view-mappings</code>	Embedded; see host-view-mappings .	

host-port-statistics

This basetype is used by [show host-port-statistics](#).

Table 48 host-port-statistics properties

Name	Type	Description
durable-id	string	Host port ID in the form <code>hostport_controller-ID-and-port-number</code> .
bytes-per-second	uint64	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted <code>bytes-per-second</code> value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint32	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint32	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted <code>data-read</code> value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted <code>data-written</code> value.
queue-depth	uint32	The number of pending I/O operations currently being serviced.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time, in microseconds, for all read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	uint32	Average response time, in microseconds, for all write operations, calculated over the interval since these statistics were last requested or reset.
reset-time	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted <code>reset-time</code> value.
start-sample-time	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.
start-sample-time-numeric	uint32	Unformatted <code>start-sample-time</code> value.
stop-sample-time	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
stop-sample-time-numeric	uint32	Unformatted <code>stop-sample-time</code> value.

hosts

This basetype is used by [show hosts \(Deprecated\)](#).

Table 49 hosts properties

Name	Type	Description
host-id	string	FC or SAS host port WWN, or iSCSI host initiator node name (typically the IQN).
host-name	string	User-defined name of the host port, or blank.
host-discovered	string	<ul style="list-style-type: none">• Yes: The host was discovered and its entry was automatically created.• No: The host entry was manually created.
host-mapped	string	<ul style="list-style-type: none">• Yes: At least one volume is explicitly mapped to the host.• No: No volumes are explicitly mapped to the host.
host-profile	string	<ul style="list-style-type: none">• Standard: Default profile.
host-bus-type	string	<ul style="list-style-type: none">• If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.• If the host entry was manually created: Undefined.
host-port-bits-a	uint32	For internal use only.
host-port-bits-b	uint32	For internal use only.

host-view

This basetype is used by [show host-maps \(Deprecated\)](#).

Table 50 host-view properties

Name	Type	Description
id	string	FC or SAS host port WWN, or iSCSI host initiator node name (typically the IQN).
hba-nickname	string	User-defined name of the host port, or blank.
host-profile	string	<ul style="list-style-type: none">Standard: Default profile.
host-view-mapping		Embedded; see host-view-mappings .

host-view-mappings

This basetype is used by [show maps](#) when the `initiator` parameter is specified, and [show host-maps](#) (Deprecated).

Table 51 host-view-mappings properties

Name	Type	Description
<code>volume-name</code>	<code>string</code>	Volume name.
<code>volume-serial</code>	<code>string</code>	Volume serial number.
<code>lun</code>	<code>string</code>	LUN assigned to the mapping.
<code>access</code>	<code>string</code>	<ul style="list-style-type: none"><code>no-access</code>: Host is denied access to the volume.<code>not-mapped</code>: The volume is not mapped.<code>read-only</code>: Host has read access to the volume.<code>read-write</code>: Host has read and write access to the volume.
<code>access-numeric</code>	<code>uint32</code>	Numeric equivalents of <code>access</code> values. <ul style="list-style-type: none"><code>0</code>: <code>not-mapped</code><code>1</code>: <code>no-access</code><code>2</code>: <code>read-only</code><code>3</code>: <code>read-write</code>
<code>ports</code>	<code>string</code>	Controller host ports assigned to the mapping.

initiator

This basetype is used by [show initiators](#).

Table 52 initiator properties

Name	Type	Description
durable-id	string	Initiator ID.
nickname	string	The nickname of the initiator, or blank.
discovered	string	<ul style="list-style-type: none">• Yes: The initiator was discovered and its entry was automatically created.• No: The initiator was manually created.
mapped	string	<ul style="list-style-type: none">• Yes: At least one volume is explicitly mapped to the initiator.• No: No volumes are explicitly mapped to the initiator.
profile	string	<ul style="list-style-type: none">• Standard: Default profile.
host-bus-type	string	<ul style="list-style-type: none">• If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.• If the host entry was manually created: Undefined.
host-bus-type-numeric	uint32	Numeric equivalents of host-bus-type values. <ul style="list-style-type: none">• 6: FC• 8: SAS• 9: iSCSI
id	string	<ul style="list-style-type: none">• For an FC initiator, its WWPN.• For a SAS initiator, its WWPN.• For an iSCSI initiator, its node name (typically the IQN).
host-id	string	If the initiator is a member of a host, the serial number of the host. Otherwise, NOHOST.
host-key	string	If the initiator is a member of a host, the durable ID of the host. Otherwise, HU.
host-port-bits-a	uint32	For internal use only.
host-port-bits-b	uint32	For internal use only.

initiator-view

This basetype is used by [show maps](#) when the `initiator` parameter is specified.

Table 53 initiator-view properties

Name	Type	Description
<code>id</code>	<code>string</code>	<ul style="list-style-type: none">For an FC initiator, its WWPN.For a SAS initiator, its WWPN.For an iSCSI initiator, its node name (typically the IQN).
<code>hba-nickname</code>	<code>string</code>	The nickname of the initiator.
<code>host-profile</code>	<code>string</code>	<ul style="list-style-type: none">Standard: Default profile.
<code>host-view-mappings</code>		Embedded; see host-view-mappings .

inquiry

This basetype is used by [show inquiry](#).

Table 54 inquiry properties

Name	Type	Description
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
sc-fw	string	Storage Controller firmware version.
sc-loader	string	Storage Controller loader firmware version.
serial-number	string	Controller serial number.
mac-address	string	Controller network port MAC address.
ip-address	string	Controller network port IP address.
nvr-am-defaults	string	For internal use only.

io-modules

This basetype is used by [show enclosures](#).

Table 55 io-modules properties

Name	Type	Description
durable-id	string	I/O module ID.
controller-id	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none"> 0: B 1: A
name	string	FRU name.
description	string	FRU long description.
part-number	string	FRU part number.
serial-number	string	FRU serial number.
revision	string	FRU hardware revision level.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the controller's PCBA was programmed or a power supply module was manufactured.
mfg-date-numeric	uint32	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
position	string	Fan unit position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> Top Bottom Left Right
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"> 0: Top 1: Bottom 2: Left 3: Right
configuration-serialnumber	string	Configuration serial number.
phy-isolation	string	Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller. <ul style="list-style-type: none"> Enabled: PHY fault isolation is enabled. Disabled: PHY fault isolation is disabled.
phy-isolation-numeric	uint32	Numeric equivalents for phy-isolation values. <ul style="list-style-type: none"> 0: Enabled 1: Disabled

Table 55 io-modules properties (continued)

Name	Type	Description
status	string	<ul style="list-style-type: none"> Operational Down Not installed Unknown
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Operational 1: Down 2: Not installed 3: Unknown
health	string	<ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended action to take to resolve the health issue.
unhealthy-component	Embedded; see unhealthy-component .	
enclosure-id	Embedded; see expander-ports .	

iscsi-parameters

This basetype is shown by [show iscsi-parameters](#).

Table 56 iscsi-parameters properties

Name	Type	Description
chap	string	Shows whether Challenge-Handshake Authentication Protocol (CHAP) is enabled. <ul style="list-style-type: none">Enabled: CHAP is enabled.Disabled: CHAP is disabled.
chap-numeric	uint32	Numeric equivalents for chap values. <ul style="list-style-type: none">0: Disabled1: Enabled
jumbo-frames	string	Shows whether support for jumbo frames is enabled. <ul style="list-style-type: none">Enabled: Jumbo-frame support is enabled.Disabled: Jumbo-frame support is disabled.
jumbo-frames-numeric	uint32	Numeric equivalents for jumbo-frames values. <ul style="list-style-type: none">0: Disabled1: Enabled
isns	string	Shows whether support for Internet Storage Name Service (iSNS) is enabled. <ul style="list-style-type: none">Enabled: iSNS is enabled.Disabled: iSNS is disabled.
isns-numeric	uint32	Numeric equivalents for isns values. <ul style="list-style-type: none">0: Disabled1: Enabled
isns-ip	string	Address of the iSNS server.
isns-alt-ip	string	Address of the alternate iSNS server.
iscsi-speed	string	iSCSI host port link speed. <ul style="list-style-type: none">auto: The proper speed is auto-negotiated.1Gbps: The speed is forced to 1 Gbit/s, overriding a downshift that can occur during auto-negotiation with 1-Gbit/s HBAs. This setting does not apply to 10-Gbit/s HBAs.
iscsi-speed-numeric	uint32	Numeric equivalents for iscsi-speed values. <ul style="list-style-type: none">0: auto1: 1Gbps
iscsi-ip-version	uint8	iSCSI IP version. <ul style="list-style-type: none">4: iSCSI host port addresses use IPv4 format.6: iSCSI host port addresses use IPv6 format.

iscsi-port

This basetype is used by [show ports](#) and [show host-parameters \(Deprecated\)](#) for an iSCSI host port.

Table 57 iscsi-port properties

Name	Type	Description
ip-version	string	iSCSI IP version. <ul style="list-style-type: none">IPv4: iSCSI host port addresses use IPv4 format.IPv6: iSCSI host port addresses use IPv6 format.
ip-address	string	Assigned port IP address.
gateway	string	For IPv4, gateway IP address for assigned IP address.
netmask	string	For IPv4, subnet mask for assigned IP address.
default-router	string	For IPv6, default router for the assigned IP address.
link-local-address	string	For IPv6, the link-local address that is automatically generated from the MAC address and assigned to the port.
mac-address	string	Unique Media Access Control (MAC) hardware address, also called the physical address.
sfp-status	string	SFP status: <ul style="list-style-type: none">OKNot present: No SFP is inserted in this port.Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.Incorrect protocol: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.
sfp-present	string	Shows whether the port contains an SFP. <ul style="list-style-type: none">Not PresentPresent
sfp-present-numeric	uint32	Numeric equivalents for sfp-present values. <ul style="list-style-type: none">0: Not Present1: Present
sfp-vendor	string	The SFP vendor.
sfp-part-number	string	The SFP part number.
sfp-revision	string	The SFP revision.
sfp-10G-compliance	string	The SFP's 10G compliance code, if supported, or No Support.
sfp-ethernet-compliance	string	The SFP's Ethernet compliance code, if supported, or No Support.
sfp-cable-technology	string	Shows whether the SFP supports active or passive cable technology.
sfp-cable-length	uint8	The link length (in meters) that is supported by the SFP while operating in compliance with applicable standards for the cable type.

license

This basetype is used by [show license](#).

Table 58 license properties

Name	Type	Description
license-key	string	<ul style="list-style-type: none"> <i>key</i>: License is installed and valid. <i>not installed</i>: License is invalid or is not installed.
platform-max-snapshots	uint32	Maximum number of snapshots that the highest-level license allows.
base-max-snapshots	uint32	Maximum number of snapshots allowed without an installed license.
max-snapshots	uint32	Maximum number of snapshots allowed by the installed license.
in-use-snapshots	uint32	Number of existing licensed snapshots.
max-snapshots-expiry	string	License status of the Snapshot feature. <ul style="list-style-type: none"> <i>Never</i>: License is purchased and doesn't expire. <i>days</i>: Number of days remaining for a temporary license. <i>Expired</i>: Temporary license has expired and cannot be renewed. <i>Expired/Renewable</i>: Temporary license has expired and can be renewed. <i>N/A</i>: No license installed.
max-snapshots-expiry-numeric	string	Numeric equivalents for max-snapshots-expiry values. <ul style="list-style-type: none"> <i>0</i>: <i>Never</i> <i>254</i>: <i>Expired/Renewable</i> <i>255</i>: <i>Expired</i> <i>days</i>: Number of days remaining
virtualization	string	Shows whether the Virtualization feature is enabled. <ul style="list-style-type: none"> <i>Disabled</i>: Virtualization is disabled. <i>Enabled</i>: Virtualization is enabled.
virtualization-numeric	string	Numeric equivalents for virtualization values. <ul style="list-style-type: none"> <i>0</i>: <i>Disabled</i> <i>1</i>: <i>Enabled</i>
virtualization-expiry	string	Shows when the Virtualization license will expire. <ul style="list-style-type: none"> <i>Never</i>: License is purchased and doesn't expire. <i>days</i>: Number of days remaining for a temporary license. <i>Expired</i>: Temporary license has expired and cannot be renewed. <i>Expired/Renewable</i>: Temporary license has expired and can be renewed. <i>N/A</i>: No license installed.
virtualization-expiry-numeric	string	Numeric equivalents for virtualization-expiry values. <ul style="list-style-type: none"> <i>0</i>: <i>Never</i> <i>254</i>: <i>Expired/Renewable</i> <i>255</i>: <i>Expired</i> <i>days</i>: Number of days remaining
performance-tier	string	Shows whether the Performance Tier feature is enabled. <ul style="list-style-type: none"> <i>Disabled</i>: Performance Tier is disabled. <i>Enabled</i>: Performance Tier is enabled.

Table 58 license properties (continued)

Name	Type	Description
performance-tier-numeric	string	Numeric equivalents for performance-tier values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
performance-tier-expiry	string	Shows when the Performance Tier license will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
performance-tier-expiry-numeric	string	Numeric equivalents for performance-tier-expiry values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
volume-copy	string	Shows whether the Volume Copy feature is enabled. <ul style="list-style-type: none"> Disabled: Volume Copy is disabled. Enabled: Volume Copy is enabled.
volume-copy-numeric	uint32	Numeric equivalents for volume-copy values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
volume-copy-expiry	string	Shows when the Volume Copy license will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
volume-copy-expiry-numeric	uint32	Numeric equivalents for volume-copy-expiry values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
remote-snapshot-replication	string	Shows whether the AssuredRemote feature is enabled. <ul style="list-style-type: none"> Disabled: AssuredRemote is disabled. Enabled: AssuredRemote is enabled.
remote-snapshot-replication-numeric	uint32	Numeric equivalents for remote-snapshot-replication values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
remote-snapshot-replication-expiry	string	Shows when the AssuredRemote feature will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.

Table 58 license properties (continued)

Name	Type	Description
remote-snapshot-replication-expiry-numeric	uint32	Numeric equivalents for remote-snapshot-replication values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
vds	string	Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled. <ul style="list-style-type: none"> Disabled: VDS is disabled. Enabled: VDS is enabled.
vds-numeric	uint32	Numeric equivalents for vds values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
vds-expiry	string	Shows when the VDS (Virtual Disk Service) Hardware Provider will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
vds-expiry-numeric	uint32	Numeric equivalents for vds-expiry values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
vss	string	Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is enabled. <ul style="list-style-type: none"> Disabled: VSS is disabled. Enabled: VSS is enabled.
vss-numeric	uint32	Numeric equivalents for vss values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
vss-expiry	string	Shows when the VSS (Volume Shadow Copy Service) Hardware Provider will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
vss-expiry-numeric	uint32	Numeric equivalents for vss-expiry values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
dsd	string	Shows whether the Drive Spin Down (DSD) feature is enabled. <ul style="list-style-type: none"> Disabled: DSD is disabled. Enabled: DSD is enabled.

Table 58 license properties (continued)

Name	Type	Description
dsd-numeric	uint32	Numeric equivalents for dsd values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
dsd-expiry	string	Shows when the Drive Spin Down (DSD) feature will expire. <ul style="list-style-type: none"> Never: and doesn't expire.
dsd-expiry-numeric	uint32	Numeric equivalents for dsd-expiry values. <ul style="list-style-type: none"> 0: Never
sra	string	Shows whether Storage Replication Adapter (SRA) support is enabled. <ul style="list-style-type: none"> Disabled: SRA is disabled. Enabled: SRA is enabled.
sra-numeric	uint32	Numeric equivalents for sra values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
sra-expiry	string	Shows when the SRA feature will expire. <ul style="list-style-type: none"> Never: and doesn't expire.
sra-expiry-numeric	uint32	Numeric equivalents for sra-expiry values. <ul style="list-style-type: none"> 0: Never

log-header-table

This basetype is used in the log file downloaded from the system by using the WBI or FTP.

Table 59 log-header-table properties

Name	Type	Description
log-contact	string	Contact person's name, if specified in the WBI Save Logs panel.
log-email	string	Contact's email address, if specified in the WBI Save Logs panel.
log-phone	string	Contact's phone number, if specified in the WBI Save Logs panel.
log-comments	string	Comments describing the problem and specifying the date and time when the problem occurred, if specified in the WBI Save Logs panel.
log-content	uint32	For internal use only.
log-timestamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when log content was saved to the file.
log-timestamp-numeric	uint32	Unformatted log-timestamp value.

master-volumes

This basetype is shown by [show master-volumes](#).

Table 60 master-volumes properties

Name	Type	Description
virtual-disk-name	string	Vdisk name.
serial-number	string	Master volume serial number.
name	string	Master volume name.
size	string	Master volume size, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
status	string	Master volume status. <ul style="list-style-type: none">• Available: The master volume is available.• Unavailable: The master volume is not available.
status-reason	string	More information about the status value. <ul style="list-style-type: none">• MV Not Accessible: Master volume is not accessible.• MV Not Found: Master volume is not found.• RV: Replication volume (either a primary volume or a secondary volume).• RV Prepared: Replication-prepared volume, which could become a secondary volume in a replication set.• SP Not Accessible: Snap pool is not accessible.• SP Not Found: Snap pool is not found.• ---: The master volume is available.• Unknown Reason
snap-pool-name	string	Snap-pool name.
snapshots	string	Quantity of snapshots that exist for the master volume.
snap-data	string	Amount of snap-pool space occupied by this master volume for its associated snapshots (preserved and write data).
snap-data-numeric	uint32	Unformatted snap-data value in 512-byte blocks.
rollback	string	<ul style="list-style-type: none">• value: Percent complete if a rollback is in progress.• ---: No rollback is in progress.

network-parameters

This basetype is used by [show network-parameters](#).

Table 61 network-parameters properties

Name	Type	Description
durable-id	string	Controller network port ID in the form <code>mgmtport_controller-ID</code> .
active-version	uint32	The configured network port IP version. <ul style="list-style-type: none"> 4: IPv4 6: IPv6
ip-address	string	Controller network port IP address.
gateway	string	Controller network port gateway IP address
subnet-mask	string	Controller network port IP subnet mask
mac-address	string	Controller network port MAC address.
addressing-mode	string	<ul style="list-style-type: none"> Manual: Obtain network address from manual (static) settings. DHCP: Use DHCP to obtain network address.
addressing-mode-numeric	uint32	Numeric equivalents for <code>addressing-mode</code> values. <ul style="list-style-type: none"> 1: Manual 2: DHCP
link-speed	string	Not applicable.
link-speed-numeric	uint32	Not applicable.
duplex-mode	string	Not applicable.
duplex-mode-numeric	uint32	Not applicable.
auto-negotiation	string	Not applicable.
auto-negotiation-numeric	uint32	Not applicable.
health	string	The health of the network connection. <ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
health-numeric	uint32	Numeric equivalents for <code>health</code> values. <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

Table 61 network-parameters properties (continued)

Name	Type	Description
ping-broadcast	string	<ul style="list-style-type: none">• Enabled: The system will respond to a broadcast ping.• Disabled: The system will not respond to a broadcast ping.
ping-broadcast-numeric	uint32	Numeric equivalents for ping-broadcast values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled

ntp-status

This basetype is used by `show ntp-status`.

Table 62 ntp-status properties

Name	Type	Description
ntp-status	string	Shows whether use of Network Time Protocol (NTP) is enabled. <ul style="list-style-type: none">• activated: NTP is enabled.• deactivated: NTP is disabled.
ntp-server-address	string	<ul style="list-style-type: none">• The current NTP server IP address if NTP is enabled.• The last-set NTP server IP address if NTP was enabled and has been disabled.• 0.0.0.0 if the NTP server IP address has not been set.
ntp-contact-time	string	<ul style="list-style-type: none">• Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), of the last message received from the NTP server.• none: No contact.

policy-threshold

This basetype is used by [show snap-pools](#).

Table 63 policy-threshold properties

Name	Type	Description
threshold	string	<p>Snap pool threshold level:</p> <ul style="list-style-type: none">• Warning: The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator.• Error: The snap pool is nearly full and unless corrective action is taken, snapshot data loss is probable. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.• Critical: The snap pool is 98% full and data loss is imminent. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.
percent-usage	string	Percent of snap pool space used that triggers the threshold's policy.
policy	string	<p>Recovery policy to invoke when threshold value is reached:</p> <ul style="list-style-type: none">• autoexpand: Try to expand the snap pool by the <code>size-to-expand</code> value. If the snap pool's space usage reaches the percentage specified by its error threshold, the system will log Warning event 230 and will try to expand the snap pool by the snap pool's <code>size-to-expand</code> value (below).<ul style="list-style-type: none">• If the snap pool is successfully expanded, the system will log Informational event 444.• If the snap pool cannot be expanded because there is not enough available space in its vdisk, the system will log Warning event 444 and will automatically delete the oldest snapshot that is not a current sync point. <p>Each time the snap-pool's error threshold is reached and the system cannot auto-expand the vdisk, the oldest remaining snapshot that is not a current sync point will be deleted. This behavior occurs for each snap pool independently, based on its space usage.</p> <ul style="list-style-type: none">• deleteoldestsnapshot: Delete the oldest snapshot.• deletesnapshots: Delete all snapshots.• haltwrites: Halt writes to the snap pool.• notifyonly: Generates an event to notify the administrator.
size-to-expand	string	<ul style="list-style-type: none">• size: For the <code>autoexpand</code> policy, the size (formatted to use the current base, precision, and units) by which to expand the snap pool when the threshold is reached.• N/A: The policy is not set to <code>autoexpand</code>.
size-to-expand-numeric	uint32	Unformatted <code>size-to-expand</code> value in 512-byte blocks.

pool-hist-statistics

This basetype is used by `show pool-statistics` when the `historical` parameter is specified.

Table 64 pool-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	The total number of read and write operations since the last sampling time.
number-of-reads	uint64	The number of read operations since the last sampling time.
number-of-writes	uint64	The number of write operations since the last sampling time.
total-data-transferred	uint64	The total amount of data read and written since the last sampling time.
data-read	uint64	The amount of data read since the last sampling time.
data-read-numeric	uint64	The amount of data written since the last sampling time.
data-written	uint64	The amount of data written since the last sampling time.
data-written-numeric	uint64	The amount of data written since the last sampling time.
total-iops	uint64	The total number of read and write operations per second since the last sampling time.
read-iops	uint64	The number of read operations per second since the last sampling time.
write-iops	uint64	The number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	The total data transfer rate, in bytes per second, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted total-bytes-per-second value.
read-bytes-per-sec	uint64	The data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted read-bytes-per-second value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations since the last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.
number-of-allocated-pages	uint64	The number of 4-MB pages allocated to volumes in the pool.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.

pool-statistics

This basetype is used by [show pool-statistics](#).

Table 65 pool-statistics properties

Name	Type	Description
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted <code>sample-time</code> value.
serial-number	string	The serial number of the pool.
pool	string	The name of the pool.
pages-alloc-per-minute	uint32	The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.
pages-dealloc-per-minute	uint32	The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data.
num-pages-unmap-per-minute	uint32	The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI <code>unmap</code> command, to free storage space as a result of deleting files or formatting volumes on the host.
resettable-statistics	Embedded; see resettable-statistics .	
tier-statistics	Embedded; see tier-statistics .	

pool-summary

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

Table 66 pool-summary properties

Name	Type	Description
<code>serial-number</code>	<code>string</code>	The serial number of the pool.
<code>pool</code>	<code>string</code>	The name of the pool.
<code>pool-hist-statistics</code>		Embedded; see pool-hist-statistics .

pools

This basetype is used by [show configuration](#) and [show pools](#).

Table 67 pools properties

Name	Type	Description
name	string	The name of the pool.
serial-number	string	The serial number of the pool.
storage-type	string	<ul style="list-style-type: none"> Linear: Linear pool. Virtual: Virtual pool.
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"> 0: Linear 1: Virtual
total-size	string	The total capacity of the pool.
total-size-numeric	unit64	Unformatted total-size value in 512-byte blocks.
total-avail	string	The available capacity in the pool.
total-avail-numeric	unit64	Unformatted total-avail value in 512-byte blocks.
allocated-pages	uint32	For a virtual pool, the number of 4-MB pages that are currently in use. For a linear pool, 0.
available-pages	uint32	For a virtual pool, the number of 4-MB pages that are still available to be allocated. For a linear pool, 0.
overcommit	string	<ul style="list-style-type: none"> Disabled: The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool. Enabled: The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool. N/A: Not applicable (linear pool).
overcommit-numeric	uint32	Numeric equivalents for overcommit values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled 2: N/A
disk-groups	uint16	The number of disk groups in the pool.
volumes	uint16	The number of volumes in the pool.
page-size	string	The page size, formatted to use the current base, precision, and units.
page-size-numeric	uint64	Unformatted page-size value in 512-byte blocks.
low-threshold	string	The low threshold for page allocation as a percentage of pool capacity.
middle-threshold	string	The middle threshold for page allocation as a percentage of pool capacity.
high-threshold	string	The high threshold for page allocation as a percentage of pool capacity. The threshold value is automatically calculated based on the available capacity of the pool minus 200 GB of reserved space.

Table 67 pools properties (continued)

Name	Type	Description
utility-running	string	<p>Job running on the disk, if any.</p> <ul style="list-style-type: none"> • (blank): None. • CPYBK: The disk group is being used in a copyback operation. • DRSC: The disk group is being scrubbed. • EXPD: The disk group is being expanded. • INIT: The disk group is being initialized. • RCON: The disk group is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The disk group is being verified. • VRSC: The disk group is being scrubbed.
utility-running-numeric	uint32	<p>Numeric equivalents for job-running values.</p> <ul style="list-style-type: none"> • 0: None • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC • 9: VREMV • 11: CPYBK • 12: VPREP • 13: VDRAIN • 14: VRECV
preferred-owner	string	<p>Controller that owns the disk group and its volumes during normal operation.</p> <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
preferred-owner-numeric	uint32	<p>Numeric equivalents for preferred owner values.</p> <ul style="list-style-type: none"> • 0: B • 1: A
owner	string	<p>Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline.</p> <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
owner-numeric	uint32	<p>Numeric equivalents for owner values.</p> <ul style="list-style-type: none"> • 0: B • 1: A
rebalance	string	For internal use only.
rebalance-numeric	uint32	For internal use only.
migration	string	For internal use only.
migration-numeric	uint32	For internal use only.

Table 67 pools properties (continued)

Name	Type	Description
zero-scan	string	For internal use only.
zero-scan-numeric	uint32	For internal use only.
idle-page-check	string	For internal use only.
idle-page-check-numeric	uint32	For internal use only.
read-flash-cache	string	For internal use only.
read-flash-cache-numeric	uint32	For internal use only.
metadata-vol-size	string	The size of the pool's metadata volume, formatted to use the current base, precision, and units. This needs to be taken into consideration to account for all pages in the pool that are used.
metadata-vol-size-numeric	uint64	Unformatted metadata-vol-size value in 512-byte blocks.
total-rfc-size	string	The total size in blocks of the read cache in the pool.
total-rfc-size-numeric	uint64	Unformatted total-rfc-size value in 512-byte blocks.
available-rfc-size	string	The unused read-cache space in blocks that is available for use by the pool.
available-rfc-size-numeric	uint64	Unformatted available-rfc-size value in 512-byte blocks.
reserved-size	string	The total number of pages that are reserved for virtual volumes in the pool.
reserved-size-numeric	uint64	Unformatted reserved-size value in 512-byte blocks.
reserved-unalloc-size	string	The total number of pages that are reserved, but not yet allocated, for virtual volumes in the pool.
reserved-unalloc-size-numeric	uint64	Unformatted reserved-unalloc-size value in 512-byte blocks.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
disk-groups		Embedded; see disk-groups .

Table 67 pools properties (continued)

Name	Type	Description
tiers	Embedded;	see tiers .
unhealthy-component	Embedded;	see unhealthy-component .

port

This basetype is used by [show configuration](#) and [show ports](#).

Table 68 port properties

Name	Type	Description
durable-id	string	Controller host port ID in the form <code>hostport_controller-ID-and-port-number</code> .
controller	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-numeric	uint32	Numeric equivalents for <code>controller</code> values. <ul style="list-style-type: none">• 0: B• 1: A
port	string	Controller ID and port number.
port-type	string	<ul style="list-style-type: none">• FC: Fibre Channel.• iSCSI: Internet SCSI.• SAS: Serial Attached SCSI.
port-type-numeric	uint32	Numeric equivalents for <code>port-type</code> values. <ul style="list-style-type: none">• 6: FC• 8: SAS• 9: iSCSI
media	string	<ul style="list-style-type: none">• FC (P): Fibre Channel Point-to-Point.• FC (L): Fibre Channel-Arbitrated Loop (public or private).• FC (-): Not applicable, as when the port is disconnected.• SAS: Serial Attached SCSI.• iSCSI: Internet SCSI.
target-id	string	Port WWN or IQN.
status	string	Port status. <ul style="list-style-type: none">• Up: The port is cabled and has an I/O link.• Warning: Not all of the port's PHYs are up.• Error: The port is reporting an error condition.• Not Present: The controller module is not installed or is down.• Disconnected: Either no I/O link is detected or the port is not cabled.
status-numeric	uint32	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none">• 0: Up• 1: Warning• 2: Error• 3: Not Present• 6: Disconnected

Table 68 port properties (continued)

Name	Type	Description
actual-speed	string	Actual link speed in Mbit/s or Gbit/s. <ul style="list-style-type: none"> • 10Mb • 100Mb • 1Gb • 1.5Gb • 2Gb • 3Gb • 4Gb • 6Gb • 8Gb • 10Gb • 12Gb • 16Gb • (blank): Port is disconnected.
actual-speed-numeric	uint32	Numeric equivalents for actual-speed values. <ul style="list-style-type: none"> • 0: 1Gb • 1: 2Gb • 2: 4Gb • 4: 1.5Gb • 5: 3Gb • 6: 6Gb • 7: 8Gb • 8: 10Mb • 9: 100Mb • 10: 10Gb • 11: 12Gb • 12: 16Gb • 255: Port is disconnected.
configured-speed	string	Configured host-port link speed in Gbit/s. <ul style="list-style-type: none"> • Auto • 1Gb • 4Gb • 8Gb • 12Gb • 16Gb
configured-speed-numeric	uint32	Numeric equivalents for configured-speed values. <ul style="list-style-type: none"> • 0: 1Gb • 2: 4Gb • 3: Auto • 7: 8Gb • 11: 12Gb • 12: 16Gb
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown

Table 68 port properties (continued)

Name	Type	Description
health-numeric	string	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
port-details	Embedded; see fc-port , iscsi-port , sas-port .	

power-supplies

This basetype is used by [show power-supplies](#).

Table 69 power-supplies properties

Name	Type	Description
durable-id	string	Power supply ID in the form <code>psu_enclosure-ID.power-supply-number</code> .
enclosure-id	uint32	Enclosure ID.
serial-number	string	Power supply serial number.
description	string	FRU long description.
name	string	Power supply identifier and location.
revision	string	FRU hardware revision level.
model	string	Power supply model.
vendor	string	Power supply vendor.
location	string	Power supply location in the form <code>Enclosure enclosure-ID - position</code> , where the position is as viewed from the back of the enclosure.
position	string	Power supply position, as viewed from the back of the enclosure. <ul style="list-style-type: none">• Left• Right• Top• Bottom
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none">• 0: Left• 1: Right• 2: Top• 3: Bottom
part-number	string	FRU part number.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), when the power supply module was manufactured.
mfg-date-numeric	uint32	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
configuration-serialnumber	string	Configuration serial number.
dc12v	uint32	Voltage of the 12-volt power supply, in 100th of a volt.
dc5v	uint32	Voltage of the 5-volt power supply, in 100th of a volt.
dc33v	uint32	Voltage of the 3.3-volt power supply, in 100th of a volt.
dc12i	uint32	Voltage of the 12-volt power supply, in 100th of a volt.
dc5i	uint32	Voltage of the 5-volt power supply, in 100th of a volt.
dctemp	uint32	Power supply temperature.

Table 69 power-supplies properties (continued)

Name	Type	Description
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
status	string	Power supply status. <ul style="list-style-type: none"> • Up • Warning • Error • Not Present • Unknown
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> • 0: Up • 1: Warning • 2: Error • 3: Not Present • 4: Unknown
unhealthy-component		Embedded; see unhealthy-component .
fan-details		Embedded; see fan .

product-info

This basetype is used by [show inquiry](#).

Table 70 product-info properties

Name	Type	Description
vendor-name	string	Vendor name.
product-id	string	Product model identifier.
scsi-vendor-id	string	Vendor name returned by the SCSI INQUIRY command.

provisioning

This basetype is used by [show provisioning](#).

Table 71 provisioning properties

Name	Type	Description
volume	string	<ul style="list-style-type: none">Volume name.Blank if the vdisk or pool does not have a volume.
volume-serial	string	Volume serial number.
wnn	string	<ul style="list-style-type: none">Volume World Wide Name.Blank if the vdisk or pool does not have a volume.
controller	string	Owning controller of the vdisk or pool. <ul style="list-style-type: none">A: Controller A.B: Controller B.
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none">0: B1: A
disk-display	string	Shorthand list of the disks within a vdisk or pool.
disk-display-full	string	List or range of the disks in the vdisk or pool specified by the virtual-disk property.
virtual-disk	string	Vdisk name.
virtual-disk-serial	string	Vdisk serial number.
health	string	Health of the associated vdisk. <ul style="list-style-type: none">OKDegradedFaultN/AUnknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">0: OK1: Degraded2: Fault3: Unknown4: N/A
mapped	string	<ul style="list-style-type: none">Yes: The volume is mapped.No: The volume is not mapped.
lun-view		Embedded; see volume-view-mappings .

readcache-hist-statistics

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

Table 72 readcache-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	The total number of read and write operations since the last sampling time.
number-of-reads	uint64	The number of read operations since the last sampling time.
number-of-writes	uint64	The number of write operations since the last sampling time.
total-data-transferred	uint64	The total amount of data read and written since the last sampling time.
data-read	uint64	The amount of data read since the last sampling time.
data-read-numeric	uint64	The amount of data written since the last sampling time.
data-written	uint64	The amount of data written since the last sampling time.
data-written-numeric	uint64	The amount of data written since the last sampling time.
total-iops	uint64	The total number of read and write operations per second since the last sampling time.
read-iops	uint64	The number of read operations per second since the last sampling time.
write-iops	uint64	The number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	The total data transfer rate, in bytes per second, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted total-bytes-per-second value.
read-bytes-per-sec	uint64	The data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted read-bytes-per-second value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations since the last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.
number-of-allocated-pages	uint64	The number of 4-MB pages allocated to volumes in the pool.
number-of-pages-copied	uint64	The number of pages copied to read cache in the sample time period.
number-of-pages-discarded	uint64	The number of pages discarded from read cache (to make room for new hot data) in the sample time period.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.

redundancy

This basetype is used by [show redundancy-mode](#).

Table 73 redundancy properties

Name	Type	Description
redundancy-mode	string	<p>The system's operating mode, also called the cache redundancy mode.</p> <ul style="list-style-type: none"> Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. Active-Active ULP: Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. Single Controller: The enclosure contains a single controller. Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. Down: Both controllers are not operational.
redundancy-mode-numeric	uint32	<p>Numeric equivalents for redundancy-mode values.</p> <ul style="list-style-type: none"> 1: Independent Cache Performance Mode 2: Active-Active ULP 3: Single Controller 4: Failed Over 5: Down
redundancy-status	string	<ul style="list-style-type: none"> Redundant with independent cache: Both controllers are operational but are not mirroring their cache metadata to each other. Redundant: Both controllers are operational. Operational but not redundant: In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational. Down: This controller is not operational. Unknown: Status information is not available.
redundancy-status-numeric	uint32	<p>Numeric equivalents for redundancy-status values.</p> <ul style="list-style-type: none"> 0: Redundant with independent cache 1: Redundant 3: Operational but not redundant 4: Down 5: Unknown
controller-a-status	string	<ul style="list-style-type: none"> Operational: The controller is operational. Down: The controller is installed but not operational. Not Installed: The controller is not installed.
controller-a-status-numeric	uint32	<p>Numeric equivalents for controller-a-status values.</p> <ul style="list-style-type: none"> 0: Operational 1: Down 2: Not Installed
controller-a-serial-number	string	<ul style="list-style-type: none"> Controller module serial number Not Available: The controller is down or not installed.
controller-b-status	string	<ul style="list-style-type: none"> Operational: The controller is operational. Down: The controller is installed but not operational. Not Installed: The controller is not installed.

Table 73 redundancy properties (continued)

Name	Type	Description
controller-b-status-numeric	uint32	Numeric equivalents for controller-b-status values. <ul style="list-style-type: none"> • 0: Operational • 1: Down • 2: Not Installed
controller-b-serial-number	string	<ul style="list-style-type: none"> • Controller module serial number • Not Available: The controller is down or not installed.
other-MC-status	string	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none"> • Not Communicating • Not Operational • Operational • Unknown
other-MC-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none"> • 1524: Not Communicating • 3231: Not Operational • 4749: Operational • 1496: Unknown

refresh-counters

This basetype is used by [show refresh-counters](#).

Table 74 refresh-counters properties

Name	Type	Description
<i>basetype-name</i>	(Not shown)	Shows when the data represented by the base type was last updated. <ul style="list-style-type: none">• 0: The data has never been updated and is not cached.• <i>nonzero-number</i>: A timestamp indicating that the data has been updated. If the value has changed since the last time you called this command then the data has changed.

remote-addresses

This basetype is used by [show replication-volumes](#).

Table 75 remote-addresses properties

Name	Type	Description
connected-ports	string	<ul style="list-style-type: none">For a remote primary or secondary volume, this shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller.For a local primary or secondary volume, this shows N/A.
remote-address	string	The address of each host port in the remote system through which the volume is accessible.

remote-links

This basetype is used by [verify links](#) and [verify remote-link](#).

Table 76 remote-links properties

Name	Type	Description
local-host-port	string	Controller host port ID in the local system, in the form <code>hostport_controller-ID-and-port-number</code> .
type	string	<ul style="list-style-type: none">Unknown: Port type is unknown.FC: FC port.iSCSI: iSCSI port.
type-numeric	uint32	Numeric equivalents for type values. <ul style="list-style-type: none">0: Unknown6: FC9: iSCSI
remote-links	string	Controller host port ID of each linked port in the remote system, in the form <code>hostport_controller-ID-and-port-number</code> . Multiple ports are separated by a comma.

remote-system

This basetype is used by [show remote-systems](#).

Table 77 remote-system properties

Name	Type	Description
id	string	Remote system ID.
system-name	string	<ul style="list-style-type: none"> The name of the remote system. Uninitialized Name: The default value.
system-contact	string	<ul style="list-style-type: none"> The name of the person who administers the remote system. Uninitialized Contact: The default value.
system-location	string	<ul style="list-style-type: none"> The location of the remote system. Uninitialized Location: The default value.
system-information	string	<ul style="list-style-type: none"> A brief description of the remote system. Uninitialized Info: The default value.
vendor-name	string	The vendor name of the remote system.
product-id	string	The product model identifier of the remote system.
product-brand	string	The brand name of the remote system.
ip-address-a	string	<ul style="list-style-type: none"> The IP address of the network port in controller A in the remote system. Not Present
ip-address-b	string	<ul style="list-style-type: none"> The IP address of the network port in controller B in the remote system. Not Present
username	string	The name of a user that is configured in the remote system. This must be a user with the manage role to remotely configure or provision that system.
status	string	<ul style="list-style-type: none"> Uninitialized: This system hasn't communicated with the remote system. Ready: This system has contacted the remote system and it is ready to use. Connected: This system is transferring data to the remote system. Not Connected: The system is not connected to the remote system.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Uninitialized 1: Ready 2: Connected
last-connected	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when successful communication was last established between the MC in the local system and the MC in the remote system. This value does not indicate when connection status was last determined, and will not be updated if the remote MC is not accessible or if the connection status is Not Connected.
interfaces	string	<ul style="list-style-type: none"> FC iSCSI SAS Hybrid: FC and iSCSI.
interfaces-numeric	uint32	Numeric equivalents for interfaces values. <ul style="list-style-type: none"> 0: FC 1: iSCSI 2: SAS 3: Hybrid
storage-model	string	<ul style="list-style-type: none"> LINEAR

Table 77 remote-system properties (continued)

Name	Type	Description
storage-model-numeric	uint32	Numeric equivalents for storage-model values. <ul style="list-style-type: none"> 0: LINEAR
isvalid-ip-a	string	<ul style="list-style-type: none"> False: The IP address is not valid for controller module A in the remote system. True: The IP address is valid for controller module A in the remote system.
isvalid-ip-a-numeric	uint32	Numeric equivalents for isvalid-ip-a values. <ul style="list-style-type: none"> 0: False 1: True
isvalid-ip-b	string	<ul style="list-style-type: none"> False: The IP address is not valid for controller B in the remote system. True: The IP address is valid for controller B in the remote system.
isvalid-ip-b-numeric	uint32	Numeric equivalents for isvalid-ip-b values. <ul style="list-style-type: none"> 0: False 1: True

replicate-volume-tasks

This basetype is used by [show tasks](#) and [show task-details \(Deprecated\)](#) for a `ReplicateVolume` task.

Table 78 replicate-volume-tasks properties

Name	Type	Description
<code>primary-volume-name</code>	<code>string</code>	Primary volume name.
<code>primary-volume-serial</code>	<code>string</code>	Primary volume serial number.
<code>snapshot-prefix</code>	<code>string</code>	A label to identify snapshots created by this task.
<code>replication-mode</code>	<code>string</code>	<ul style="list-style-type: none"><code>new-snapshot</code>: Replicate a new snapshot of the volume to the remote system.<code>last-snapshot</code>: Replicate the last (most recent existing) snapshot of the volume to the remote system.
<code>retention-count</code>	<code>uint32</code>	Number of snapshots to retain with this prefix, from 3 to 32.
<code>last-created</code>	<code>string</code>	<ul style="list-style-type: none">The name of the last snapshot created by the task.Blank if the task has not created a snapshot.
<code>last-used</code>	<code>string</code>	For a task whose replication mode is <code>last-snapshot</code> , the name of the last snapshot used for replication. Otherwise, N/A.
<code>snapshot</code>	Embedded; see snap-tasks .	

replication-image

This basetype is used by [show replication-images](#).

Table 79 replication-image properties

Name	Type	Description
image-key	string	Replication image ID.
replication-volume-serial-number	string	Replication volume serial number.
image-serial-number	string	Replication image serial number.
replication-image-source	string	Name of the source replication image.
snapshot-serial	string	Replication snapshot serial number associated with the image. The replication snapshot is associated with the replication volume specified in the request.
snapshot-name	string	Replication snapshot name associated with the image. For a secondary image, this value is not filled in until the replication is completed.
creation-date-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication image was created on the replication volume.
creation-date-time-numeric	uint32	Unformatted creation-date-time value.
image-details	Embedded; see replication-image-params .	

replication-image-params

This basetype is used by [show replication-images](#).

Table 80 replication-image-params properties

Name	Type	Description
status	string	<p>Replication image status.</p> <ul style="list-style-type: none"> • N/A: The image information is not valid. • Queued: The image is known to exist in the primary-view volume but replication has not started. • Replicating: The image is being replicated. • Suspended: The image is being replicated but replication is suspended. • Complete: The image is created, fully replicated, and available. • Create-Snapshot: The image is fully replicated but a snapshot of the image is being created. • Offline: The image has been replicated but is unusable due to an error.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: N/A • 1: Queued • 2: Replicating • 3: Suspended • 4: Create-Snapshot • 5: Complete • 6: Offline
progress	string	The percentage complete if the image is being replicated. Applies only to secondary volumes.
start-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation started on the replication volume.
start-time-numeric	uint32	Unformatted start-time value.
update-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation status was last updated.
update-time-numeric	uint32	Unformatted update-time value.
suspended-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation was suspended or resumed.
suspended-time-numeric	uint32	Unformatted suspended-time value.
est-completion-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation is estimated to complete.
est-completion-time-numeric	uint32	Unformatted est-completion-time value.
time	string	Total time of replication, in the format <i>hour:minutes:seconds</i> (UTC), including any suspension time.

replication-set

This basetype is used by [show replication-sets](#).

Table 81 replication-set properties

Name	Type	Description
name	string	Replication set name.
serial-number	string	Replication set serial number.
primary		Embedded; see replication-volume .

replication-volume

This basetype is used by [show replication-volumes](#).

Table 82 replication-volume properties

Name	Type	Description
name	string	Replication volume name.
serial-number	string	Replication volume serial number.
status	string	<p>Replication volume status.</p> <ul style="list-style-type: none"> • Initializing: The initial (full) replication to the volume is in progress. • Online: The volume is online and is consistent with the last replicated image. • Inconsistent: The volume is online but is in an inconsistent state. A full replication is required to initialize it. • Replicating: The volume is online and replication is in progress. • Replicate-delay: The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring. • Suspended: The volume is online but the in-progress replication has been suspended. • Offline: The volume cannot be accessed and is unusable due to an error. • Establishing proxy: The volume is establishing a proxy connection to a remote volume. This will occur when a detached secondary volume is reattached and is re-establishing a connection with the primary system in preparation for replication. • Detached: The volume is detached for removal.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: Initializing • 1: Online • 2: Inconsistent • 3: Replicating • 4: Replicate-Delay • 5: Suspended • 6: Offline • 7: Establishing proxy • 8: Detached
status-reason	string	<p>More information about the status value.</p> <ul style="list-style-type: none"> • N/A • Record Missing • Adding Volume • Changing Primary
status-reason-numeric	uint32	<p>Numeric equivalents for status-reason values.</p> <ul style="list-style-type: none"> • 0: N/A • 1: Record Missing • 2: Adding Volume • 4: Changing Primary
monitor	string	<p>Replication volume monitoring status.</p> <ul style="list-style-type: none"> • OK: Communication to the remote volume is successfully occurring on the network. • Failed: Communication to the remote volume has failed because of a communication issue or because the remote volume has gone offline.

Table 82 replication-volume properties (continued)

Name	Type	Description
monitor-numeric	uint32	Numeric equivalents for monitor values. <ul style="list-style-type: none"> 2: OK other: Failed
location	string	<ul style="list-style-type: none"> Local: The replication volume is in the local system. Remote: The replication volume is in a remote system.
location-numeric	uint32	Numeric equivalents for location values. <ul style="list-style-type: none"> 0: Local 1: Remote
ip-address-a	string	IP address of the network port in controller A in the remote system.
ip-address-b	string	IP address of the network port in controller B in the remote system.
primary-volume-name	string	Primary volume name.
primary-volume-serial	string	Primary volume serial number.
primary-volume-status	string	Primary volume status. <ul style="list-style-type: none"> Online Conflict Offline
primary-volume-status-numeric	uint32	Numeric equivalents for primary-volume-status values. <ul style="list-style-type: none"> 0: Online 1: Conflict 2: Offline
max-queue	uint32	Maximum number of replication images to consider when determining the next image to replicate. Used only if the collision-policy property is set to Oldest.
max-retry-time	uint32	Maximum amount of time in seconds that the replication volume should retry a replication operation on any specific image when errors occur. Used only if the error-policy property is set to Retry.
error-policy	string	Determines the action to take when an error occurs during replication. <ul style="list-style-type: none"> Retry: Retry the replication for the time specified by the max-retry-time property. Suspend: Suspend the replication until the error is resolved automatically or through user intervention.
error-policy-numeric	uint32	Numeric equivalents for error-policy values. <ul style="list-style-type: none"> 0: Retry 1: Suspend
link-type	string	Type of ports used to link the primary and secondary volumes. <ul style="list-style-type: none"> FC: FC ports. iSCSI: iSCSI ports.
link-type-numeric	uint32	Numeric equivalents for link-type values. <ul style="list-style-type: none"> 8: FC WWNN 16: FC WWPN 64: iSCSI IPv4 128: iSCSI IPv6

Table 82 replication-volume properties (continued)

Name	Type	Description
collision-policy	string	Determines the next image to replicate when multiple replication images are queued. <ul style="list-style-type: none"> Newest: Only the latest replication image should be considered for the next replication operation. Oldest: Only the latest <i>n</i> replication images should be considered for the next replication operation, where <i>n</i> is defined by the max-queue property and the oldest of these images should be considered first.
collision-policy-numeric	uint32	Numeric equivalents for collision-policy values. <ul style="list-style-type: none"> 0: Oldest 1: Newest
monitor-interval	uint32	Interval in seconds at which the primary volume should query the secondary volume.
priority	string	Priority of the replication operation with respect to I/O operations competing for the system's processors. <ul style="list-style-type: none"> High: Replication has higher priority than host I/O. This can cause heavy I/O to be slower than normal. Medium: Replication performance is balanced with host I/O performance. Low: Replication runs at a slower rate with minimal effect on host I/O. Use when streaming data without interruption is more important than data redundancy.
priority-numeric	uint32	Numeric equivalents for priority values. <ul style="list-style-type: none"> 0: High 1: Medium 2: Low
connection-status	string	<ul style="list-style-type: none"> Not Attempted: Communication has not been attempted to the remote volume. Online: The volumes in the replication set have a valid connection but communication is not currently active. Active: Communication is currently active to the remote volume. Offline: No connection is available to the remote system.
connection-status-numeric	uint32	Numeric equivalents for connection-status values. <ul style="list-style-type: none"> 0: Not Attempted 1: Online 2: Active 3: Offline
connection-time	string	Date and time of the last communication with the remote volume, or N/A.
connection-time-numeric	uint32	Unformatted connection-time value.
replication-set	string	Replication set serial number.
local-volume-serial-number	string	Local replication volume serial number.
remote-address	Embedded; see remote-addresses .	
image-details	Embedded; see replication-image .	

replication-volume-summary

This basetype is used by [show replication-images](#).

Table 83 replication-volume-summary properties

Name	Type	Description
name	string	Replication volume name.
serial-number	string	Replication volume serial number.
volume-type	string	<ul style="list-style-type: none">Primary Volume: The volume is the primary volume in a replication set.Secondary Volume: The volume is the secondary volume in a replication set.
volume-type-numeric	uint32	Numeric equivalents for volume-type values. <ul style="list-style-type: none">0: Secondary Volume1: Primary Volume
images	Embedded; see replication-image .	

reset-snapshot-tasks

This basetype is used by [show tasks](#) and [show task-details \(Deprecated\)](#) for a ResetSnapshot task.

Table 84 reset-snapshot-tasks properties

Name	Type	Description
snapshot-name	string	Name of the snapshot to reset.
snapshot-serial	string	Serial number of the snapshot to reset.

resettable-statistics

This basetype is used by [show pool-statistics](#) and [show tier-statistics](#).

Table 85 resettable-statistics properties

Name	Type	Description
serial-number	string	The serial number of the pool or tier.
time-since-reset	uint32	The amount of time, in milliseconds, since these statistics were last reset, either by a user or by a controller restart.
time-since-sample	uint32	The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.
number-of-reads	uint64	The number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	The number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	The amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	The amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
bytes-per-second	uint64	The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
avg-rsp-time	uint32	The average response time, in microseconds, for read and write operations since the last sampling time.
avg-read-rsp-time	uint32	The average response time, in microseconds, for read operations since the last sampling time.
avg-write-rsp-time	uint32	The average response time, in microseconds, for write operations since the last sampling time.

sas-port

This basetype is used by [show ports](#) and [show host-parameters \(Deprecated\)](#) for a SAS host port.

Table 86 sas-port properties

Name	Type	Description
configured-topology	string	<ul style="list-style-type: none">• Direct
width	string	Number of PHY lanes in the SAS port.
sas-lanes-expected	string	Expected number of PHY lanes in the SAS port.
sas-active-lanes	string	Number of active lanes in the SAS port. If the port is connected and fewer lanes are active than are expected, the port status will change to Warning, the health will change to Degraded, and event 354 will be logged.

sas-status-controller-a

This basetype is used by [show expander-status](#) for controller A and controller B.

Table 87 sas-status-controller-a properties

Name	Type	Description
enclosure-id	uint32	Enclosure ID.
drawer-id	uint8	<ul style="list-style-type: none"> 0: Left 1: Middle 2: Right
drawer-id-numeric	uint32	Numeric equivalents for drawer-id values.
controller	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"> 0: B 1: A
phy	uint32	Logical ID of the PHY within a group based on the PHY type. <ul style="list-style-type: none"> Drive PHYs have IDs 0–23. SC (Storage Controller) PHYs have IDs 0–1. Egress, ingress, and inter-expander PHYs have IDs 0–3.
type	string	PHY type. <ul style="list-style-type: none"> Undefined: The PHY doesn't exist in the expander. Drive: 1-lane PHY that communicates between the expander and a disk drive. Ingress: (Expansion module only) 4-lane PHY that communicates between the expander and an expansion port. Egress: 4-lane PHY that communicates between the expander and an expansion port or SAS Out port. Inter-Exp: (Expansion module only) Communicates between the expander and the partner's expander. Unused: The PHY exists in the expander but is not connected, by design. Drawer0-Ingress: Ingress PHY for drawer 0. Drawer1-Ingress: Ingress PHY for drawer 1. Drawer2-Ingress: Ingress PHY for drawer 2. Drawer0-Egress: Egress PHY for drawer 0. Drawer1-Egress: Egress PHY for drawer 1. Drawer2-Egress: Egress PHY for drawer 2. SC-0: (Controller module only) 4-lane PHY that communicates between the expander and the SC. SC-1: (Controller module only) 2-lane PHY that communicates between the expander and the partner's expander.

Table 87 sas-status-controller-a properties (continued)

Name	Type	Description
type-numeric	uint32	<p>Numeric equivalents for type values.</p> <ul style="list-style-type: none"> 0: Undefined 1: Drive 2: Ingress 3: Egress 4: Inter-Exp 6: Unused 22: Drawer0-Ingress 23: Drawer1-Ingress 24: Drawer2-Ingress 32: Drawer0-Egress 33: Drawer1-Egress 34: Drawer2-Egress 50: SC-0 51: SC-1
status	string	<p>PHY status.</p> <ul style="list-style-type: none"> Unavailable: No status information is available. Enabled - Healthy: The PHY is enabled and healthy. Enabled - Degraded: The PHY is enabled but degraded. Disabled: The PHY has been disabled by a user or by the system.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> 0: Unavailable 1: Enabled - Healthy 2: Enabled - Degraded 3: Disabled
elem-status	string	<p>The SES status that corresponds to the PHY status.</p> <ul style="list-style-type: none"> Disabled: Critical condition is detected. Error: Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data. OK: Element is installed and no error conditions are known. Non-critical: Non-critical condition is detected. Not Used: Element is not installed in enclosure. Unknown: Either: <ul style="list-style-type: none"> Sensor has failed or element status is not available. Appears only if an I/O module indicates it has fewer PHYs than the reporting I/O module, in which case all additional PHYs are reported as unknown. Element is installed with no known errors, but the element has not been turned on or set into operation.
elem-status-numeric	uint32	<p>Numeric equivalents for elem-status values.</p> <ul style="list-style-type: none"> 0: Error 1: OK 2: Disabled 3: Non-critical 4: Error 5: Not Used 6: Unknown 7: Unknown 8: Unknown

Table 87 sas-status-controller-a properties (continued)

Name	Type	Description
elem-disabled	string	<ul style="list-style-type: none"> Enabled: PHY is enabled. Disabled: PHY is disabled.
elem-disabled-numeric	uint32	Numeric equivalents for elem-disabled values. <ul style="list-style-type: none"> 0: Enabled 1: Disabled
elem-reason	string	More information about the status value. <ul style="list-style-type: none"> Blank if elem-status is OK. Error count interrupts: PHY disabled because of error-count interrupts. PHY control: PHY disabled by a SES control page as a result of action by a Storage Controller or user. Not ready: PHY is enabled but not ready. Appears for SC-1 PHYs when the partner I/O module is not installed. Appears for Drive, SC-1, or Ingress PHYs when a connection problem exists such as a broken connector. Drive removed: PHY disabled because drive slot is empty. Unused - disabled by default: PHY is disabled by default because it is not used. Excessive PHY changes: PHY is disabled because of excessive PHY change counts.
elem-reason-numeric	uint32	Numeric equivalents for elem-reason values. <ul style="list-style-type: none"> 0: (blank) 32769: Error count interrupts 32771: PHY control 32772: Not ready 32774: Drive removed 32775: Unused - disabled by default 32776: Excessive PHY changes
change-counter	uint32	Number of times the PHY originated a BROADCAST (CHANGE). A BROADCAST (CHANGE) is sent if doubleword synchronization is lost or at the end of a Link Reset sequence.
code-violations	uint32	Number of times the PHY received an unrecognized or unexpected signal.
disparity-errors	uint32	Number of doublewords containing running disparity errors that have been received by the PHY, not including those received during Link Reset sequences. A running disparity error occurs when positive and negative values in a signal don't alternate.
crc-errors	uint32	In a sequence of SAS transfers (frames), the data is protected by a cyclic redundancy check (CRC) value. The crc-errors value specifies the number of times the computed CRC does not match the CRC stored in the frame, which indicates that the frame might have been corrupted in transit.
conn-crc-errors	uint32	Number of times the lane between two expanders experienced a communication error.
lost-dwords	uint32	Number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.
invalid-dwords	uint32	Number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.
reset-error-counter	uint32	Number of times the expander performed a reset of error counters.
flag-bits	uint32	PHY status flag bits.

sas-status-drawer

This basetype is used by [show expander-status](#) and has the same properties as [sas-status-controller-a](#).

schedules

This basetype is used by [show schedules](#) and [show schedule-details \(Deprecated\)](#).

Table 88 schedules properties

Name	Type	Description
name	string	Schedule name.
schedule-specification	string	Schedule settings for running the associated task.
status	string	Schedule status. <ul style="list-style-type: none">• Uninitialized: The schedule is not yet ready to run.• Ready: The schedule is ready to run at the next scheduled time.• Suspended: The schedule had an error and is holding in its current state.• Expired: The schedule has exceeded a constraint and will not run again.• Invalid: The schedule is invalid.• Deleted: The task has been deleted.
next-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the schedule will next run, or N/A if the schedule has expired.
next-time-numeric	uint32	Unformatted next-time value.
task-to-run	string	Name of the task that the schedule runs.
error-message	string	<ul style="list-style-type: none">• If an error occurred while running the schedule, the error message.• Blank if no error occurred.
task		Embedded; see tasks .

security-communications-protocols

This basetype is used by [show protocols](#).

Table 89 security-communications-protocols properties

Name	Type	Description
wbi-http	string	<ul style="list-style-type: none">Disabled: The standard WBI web server is disabled.Enabled: The standard WBI web server is enabled.
wbi-http-numeric	uint32	Numeric equivalents for wbi-http values. <ul style="list-style-type: none">0: Disabled1: Enabled
wbi-https	string	<ul style="list-style-type: none">Disabled: The secure WBI web server is disabled.Enabled: The secure WBI web server is enabled.
wbi-https-numeric	uint32	Numeric equivalents for wbi-https values. <ul style="list-style-type: none">0: Disabled1: Enabled
cli-telnet	string	<ul style="list-style-type: none">Disabled: The standard CLI is disabled.Enabled: The standard CLI is enabled.
cli-telnet-numeric	uint32	Numeric equivalents for cli-telnet values. <ul style="list-style-type: none">0: Disabled1: Enabled
cli-ssh	string	<ul style="list-style-type: none">Disabled: The secure shell CLI is disabled.Enabled: The secure shell CLI is enabled.
cli-ssh-numeric	uint32	Numeric equivalents for cli-ssh values. <ul style="list-style-type: none">0: Disabled1: Enabled
smis	string	<ul style="list-style-type: none">Disabled: The secure SMI-S interface is disabled.Enabled: The secure SMI-S interface is enabled. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5989.
smis-numeric	uint32	Numeric equivalents for smis values. <ul style="list-style-type: none">0: Disabled1: Enabled
usmis	string	<ul style="list-style-type: none">Disabled: The unsecure SMI-S interface is disabled.Enabled: The unsecure SMI-S interface is enabled. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988.
usmis-numeric	uint32	Numeric equivalents for smis values. <ul style="list-style-type: none">0: Disabled1: Enabled
ftp	string	<ul style="list-style-type: none">Disabled: The FTP interface is disabled.Enabled: The FTP interface is enabled.
ftp-numeric	uint32	Numeric equivalents for ftp values. <ul style="list-style-type: none">0: Disabled1: Enabled
snmp	string	<ul style="list-style-type: none">Disabled: The SNMP interface is disabled. All SNMP requests to the MIB are disabled and SNMP traps are disabled.Enabled: The SNMP interface is enabled.

Table 89 security-communications-protocols properties (continued)

Name	Type	Description
snmp-numeric	uint32	Numeric equivalents for snmp values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
debug-interface	string	<ul style="list-style-type: none"> Disabled: The Telnet debug port is disabled. Enabled: The Telnet debug port is enabled.
debug-interface-numeric	uint32	Numeric equivalents for debug-interface values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
inband-ses	string	<ul style="list-style-type: none"> Disabled: The in-band SES interface is disabled. Enabled: The in-band SES interface is enabled.
inband-ses-numeric	uint32	Numeric equivalents for inband-ses values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
activity-progress	string	<ul style="list-style-type: none"> Enabled: Access to the activity progress interface via HTTP port 8081 is enabled. This mechanism reports whether a firmware update or partner firmware update operation is active and shows the progress through each step of the operation. In addition, when the update operation completes, status is presented indicating either the successful completion, or an error indication if the operation failed. Disabled: Access to the activity progress interface via HTTP port 8081 is disabled.
activity-progress-numeric	uint32	Numeric equivalents for activity-progress values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
management-mode	string	The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session. <ul style="list-style-type: none"> v2: Uses terminology that is oriented to managing linear storage. For example, <i>vdisk</i> for disk groups and pools. v3: Uses terminology that is oriented to managing virtual and linear storage. For example, <i>disk group</i> for disk groups and <i>pool</i> for pools.
management-mode-numeric	string	Numeric equivalents for management-mode values. <ul style="list-style-type: none"> 2: v2 3: v3

sensors

This basetype is used by [show sensor-status](#).

Table 90 sensors properties

Name	Type	Description
durable-id	string	Sensor ID. For example: <code>sensor_temp_ctrl_controller-ID.sensor-number</code> and <code>sensor_volt_ctrl_controller-ID.sensor-number</code> .
enclosure-id	uint32	Enclosure ID.
sensor-name	string	Sensor name and location.
value	string	<ul style="list-style-type: none"> For a sensor, its value. For overall unit status, one of the status values below.
status	string	<ul style="list-style-type: none"> Ok: The sensor is present and detects no error condition. Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds. Error: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold. Unavailable: The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup. Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor. Unknown: The sensor is present but status is not available. Not Installed: The sensor is not present. Unsupported: Status detection is not implemented.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Unsupported 1: OK 2: Error 3: Warning 4: Unrecoverable 5: Not Installed 6: Unknown 7: Unavailable
sensor-location	uint32	Sensor location in a controller enclosure. <ul style="list-style-type: none"> 1: Unknown 2: Overall unit status 5: Power supply unit 7: Enclosure 8: On board
sensor-type	uint32	<ul style="list-style-type: none"> 2: Overall unit status 3: Temperature 6: Capacitor charge 9: Voltage

show-other-mc-status

This basetype is used by [show shutdown-status](#).

Table 91 show-other-mc-status properties

Name	Type	Description
other-mc	string	Other MC Status
other-mc-status	string	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none">• Not Communicating• Not Operational• Operational• Unknown
other-mc-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none">• 1524: Not Communicating• 3231: Not Operational• 4749: Operational• 1496: Unknown

shutdown-status

This basetype is used by [show shutdown-status](#).

Table 92 shutdown-status properties

Name	Type	Description
<code>controller</code>	<code>string</code>	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
<code>status</code>	<code>string</code>	<ul style="list-style-type: none">• <code>up</code>: The controller is operational.• <code>down</code>: The controller is shut down.• <code>not installed</code>: The controller is not installed.
<code>status-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none">• 0: <code>up</code>• 1: <code>down</code>• 2: <code>not installed</code>

snap-pools

This basetype is used by [show snap-pools](#).

Table 93 snap-pools properties

Name	Type	Description
virtual-disk-name	string	Vdisk name.
serial-number	string	Snap pool serial number.
name	string	Snap pool name.
size	string	Snap pool size, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
free	string	Amount of free space in this snap pool, formatted to use the current base, precision, and units.
free-numeric	uint32	Unformatted free value in 512-byte blocks.
free-percent-size	string	Amount of free space in this snap pool as a percentage of total space in the snap pool.
master-volumes	string	Number of master volumes associated with this snap pool.
snapshots	string	Number of snapshots using this snap pool.
status	string	<ul style="list-style-type: none">• Available: The snap pool is available for use.• Offline: The snap pool is not available for use, as in the case where its disks are not present.• Corrupt: The snap pool's data integrity has been compromised. The snap pool can no longer be used.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: Available• Bitmask with second significant digit set: Offline• Bitmask with third significant digit set: Corrupt
policy		Embedded; see policy-threshold .

snapshots

This basetype is used by [show snapshots](#).

Table 94 snapshots properties

Name	Type	Description
durable-id	string	Snapshot ID.
virtual-disk-name	string	Vdisk name.
storage-pool-name	string	The name of the pool that contains the snapshot.
serial-number	string	Snapshot serial number.
name	string	Snapshot name.
creation-date-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the snapshot was prepared or committed.
creation-date-time-numeric	uint32	Unformatted creation-date-time value.
status	string	Snapshot status. <ul style="list-style-type: none"> Available Unavailable: See the status-reason value.
status-numeric	uint32	<ul style="list-style-type: none"> 0: Available Nonzero: Unavailable
status-reason	string	Shows N/A for Available status, or one of the following reasons for Unavailable status: <ul style="list-style-type: none"> snapshot not found snap pool not found master volume not found snapshot pending (not yet committed) snap pool not accessible master volume not accessible Volume copy with modified data is in progress Rollback with modified data is in progress Unknown reason
status-reason-numeric	uint32	Numeric equivalents for status-reason values. <ul style="list-style-type: none"> 1: snapshot pending (not yet committed) 3: snap pool not accessible 4: master volume not accessible 6: Rollback with modified data is in progress 7: Volume copy with modified data is in progress 8: snapshot not found 9: snap pool not found 10: master volume not found 254: N/A <i>hex-code</i>: Unknown reason
master-volume-name	string	Name of the volume of which the snapshot was taken.
volume-parent	string	The name of the volume of which the snapshot was taken.
base-volume	string	The root of the snapshot tree, if any. A snapshot tree is a series of inter-related snapshots of a volume and can be 254 levels deep.

Table 94 snapshots properties (continued)

Name	Type	Description
base-serial-number	string	The serial number of the base volume.
num-children	uint32	The number of child snapshots (snapshots taken of this snapshot).
num-snaps-tree	uint32	The number of snapshots taken of the base volume and its children. This count includes the base volume and all snapshots that share the base volume as their root.
snap-pool-name	string	<ul style="list-style-type: none"> The name of the snap pool for linear snapshots. Blank for virtual snapshots.
snap-data	string	The total amount of write data associated with the snapshot.
snap-data-numeric	uint32	Unformatted snap-data value in 512-byte blocks.
uniquedata	string	The amount of write data that is unique to the snapshot.
uniquedata-numeric	uint32	Unformatted uniquedata value in 512-byte blocks.
shareddata	string	The amount of write data that is shared between this snapshot and other snapshots.
shareddata-numeric	uint32	Unformatted shareddata value in 512-byte blocks.
priority-value	string	<p>Retention priority for the snapshot, based on the snapshot attributes and the user-defined retention priority for the snapshot type.</p> <ul style="list-style-type: none"> 0x2000: Queued snapshot. The snapshot was taken for remote replication but is queued, waiting for a previous replication to complete. 0x4000: Replication snapshot. 0x6000: Standard snapshot. 0x8000: Common sync point. The latest snapshot that is copy-complete on all secondary volumes. 0xa000: Volume-copy snapshot. Snapshot that is being used to copy data from a source volume to a destination volume. 0xc000: Replicating snapshot. Snapshot that is being replicated from a primary system to a secondary system. 0xe000: Only sync point. The snapshot is the only sync point that is available on any secondary volume.
user_priority-value	string	User-defined retention priority for the snapshot type.

Table 94 snapshots properties (continued)

Name	Type	Description
snapshot-type	string	<p>Snapshot type.</p> <ul style="list-style-type: none"> Standard snapshot: Snapshot of a master volume that consumes a snapshot license. Standard snapshot (DRM): A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM). Replication snapshot: For a primary or secondary volume, a snapshot that was created by a replication operation but is not a sync point. Replication snapshot (Replicating): For a primary volume, a snapshot that is being replicated to a secondary system. Replication snapshot (Current sync point): For a primary or secondary volume, the latest snapshot that is copy-complete on any secondary system in the replication set. Replication snapshot (Common sync point): For a primary or secondary volume, the latest snapshot that is copy-complete on all secondary systems in the replication set. Replication snapshot (Old Common sync point): For a primary or secondary volume, a common sync point that has been superseded by a new common sync point. Replication snapshot (Only sync point): For a primary or secondary volume, the only snapshot that is copy-complete on any secondary system in the replication set. Replication snapshot (Queued): For a primary volume, a snapshot associated with a replication operation that is waiting for a previous replication operation to complete. Replication snapshot (Awaiting replicate): For a primary volume, a snapshot that is waiting to be replicated to a secondary system.
snapshot-type-numeric	string	<p>Numeric equivalents for snapshot-type values.</p> <ul style="list-style-type: none"> 0x00004000: Standard snapshot 0x0000b000: Standard snapshot (DRM) 0x00008000: Replication snapshot 0x00010000: Replication snapshot (Replicating) 0x00020000: Replication snapshot (Current sync point) 0x00040000: Replication snapshot (Common sync point) 0x00080000: Replication snapshot (Only sync point) 0x00100000: Replication snapshot (Queued) 0x00200000: Replication snapshot (Awaiting replicate) 0x00800000: Replication snapshot (Common sync point) 0x00000000: N/A
storage-type	string	<ul style="list-style-type: none"> Linear: Linear pool. Virtual: Virtual pool.
storage-type-numeric	uint32	<p>Numeric equivalents for storage-type values.</p> <ul style="list-style-type: none"> 0: Linear 1: Virtual

snapshot-with-retention-tasks

This basetype is used by [show tasks](#) and [show task-details \(Deprecated\)](#) for a TakeSnapshot task.

Table 95 snapshot-with-retention-tasks properties

Name	Type	Description
master-volume-name	string	Source volume name.
master-volume-serial	string	Source volume serial number.
snapshot-prefix	string	A label to identify snapshots created by this task.
retention-count	uint32	Number of snapshots to retain with this prefix. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.
last-created	string	<ul style="list-style-type: none">The name of the last snapshot created by the task.Blank if the task has not created a snapshot.
snapshot	Embedded; see snap-tasks .	

snap-tasks

This basetype is used by [show schedules](#), [show schedule-details \(Deprecated\)](#), [show tasks](#), and [show task-details \(Deprecated\)](#) for a task that has created at least one snapshot.

Table 96 snap-tasks properties

Name	Type	Description
snapshot-name	string	Snapshot name.
snapshot-serial	string	Snapshot serial number.

snmp-parameters

This basetype is used by `show snmp-parameters`.

Table 97 snmp-parameters properties

Name	Type	Description
snmp-enabled	string	Shows whether the Simple Network Management Protocol (SNMP) interface is enabled or disabled. <ul style="list-style-type: none">• Disabled: SNMP is disabled.• Enabled: SNMP is enabled.
snmp-enabled-numeric	uint32	Numeric equivalents for snmp-enabled values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
snmp-filter	string	Minimum level of events to include for SNMP traps. <ul style="list-style-type: none">• crit: Only critical events are sent as traps.• error: Error and critical events are sent as traps.• warn: Warning, error, and critical events are sent as traps.• info: All events are sent as traps.• none: No events are sent as traps and traps are disabled.
snmp-filter-numeric	uint32	Numeric equivalents for snmp-filter values. <ul style="list-style-type: none">• 0: none• 1: info• 2: error• 4: warn• 8: crit
snmp-trap-host-1	string	Trap host IP address.
snmp-trap-host-2	string	Trap host IP address.
snmp-trap-host-3	string	Trap host IP address.
snmp-read-community	string	The community string for read-only access. The value is obscured for users having only the monitor role and is shown in clear text for users having the manage role.
snmp-write-community	string	The community string for write access. The value is obscured for users having only the monitor role and is shown in clear text for users having the manage role.

status

This basetype is used by all commands except `exit`, `help`, and `meta`. (`exit` does not provide a response; `help` always prints text; `meta` does not use the `status` object.)

Table 98 status properties

Name	Type	Description
<code>response-type</code>	<code>string</code>	<ul style="list-style-type: none">• <code>Success</code>: The command succeeded.• <code>Error</code>: The command failed.• <code>Info</code>: The command returned an informational message.
<code>response-type-numeric</code>	<code>uint32</code>	<ul style="list-style-type: none">• <code>0</code>: <code>Success</code>• <code>1</code>: <code>Error</code>• <code>2</code>: <code>Info</code>
<code>response</code>	<code>string</code>	A message stating what the command accomplished, why the command failed, or information about the command's progress.
<code>return-code</code>	<code>sint32</code>	<ul style="list-style-type: none">• <code>0</code>: The command completed.• <code>-nnnnn</code>: The command failed.
<code>component-id</code>	<code>string</code>	Not used.
<code>time-stamp</code>	<code>string</code>	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), when the command was issued.
<code>time-stamp-numeric</code>	<code>uint32</code>	Unformatted <code>time-stamp</code> value.

syslog-parameters

This basetype is used by [show syslog-parameters](#).

Table 99 syslog-parameters properties

Name	Type	Description
syslog-host-ip	string	The IP address of the remote syslog server to use for the notifications.
syslog-notification-level	string	Shows the minimum severity for which the system sends notifications: <ul style="list-style-type: none">• <code>crit</code>: Sends notifications for Critical events only.• <code>error</code>: Sends notifications for Error and Critical events.• <code>warn</code>: Sends notifications for Warning, Error, and Critical events.• <code>info</code>: Sends notifications for all events.• <code>none</code>: Disables syslog notification and clears the settings.
syslog-notification-level-numeric	uint32	Numeric equivalents for <code>syslog-notification-level</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>none</code>• <code>8</code>: <code>crit</code>• <code>12</code>: <code>error</code>• <code>14</code>: <code>warn</code>• <code>15</code>: <code>info</code>
syslog-host-port	uint32	The port on which the remote syslog facility is expected to listen for notifications.

system

This basetype is used by [show configuration](#) and [show system](#).

Table 100 system properties

Name	Type	Description
system-name	string	The name of the storage system. The default is Uninitialized Name.
system-contact	string	The name of the person who administers the system. The default is Uninitialized Contact.
system-location	string	The location of the system. The default is Uninitialized Location.
system-information	string	A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.
midplane-serial-number	string	The serial number of the controller enclosure midplane.
vendor-name	string	The vendor name.
product-id	string	The product model identifier.
product-brand	string	The product brand name.
scsi-vendor-id	string	The vendor name returned by the SCSI INQUIRY command.
scsi-product-id	string	The product identifier returned by the SCSI INQUIRY command.
enclosure-count	uint32	The number of enclosures in the system.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
other-MC-status	string	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none"> • Operational • Not Operational • Not Communicating • Unknown
other-MC-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none"> • 1524: Not Communicating • 3231: Not Operational • 4749: Operational • 1496: Unknown
pfuStatus	string	Shows whether partner firmware update is running on the system, or is idle.
supported-locales	string	Supported display languages: English, Spanish, French, German, Italian, Japanese, Dutch, Chinese-Simplified, Chinese-Traditional, Korean.

Table 100 system properties (continued)

Name	Type	Description
current-node-wwn	string	Storage system node World Wide Name (WWNN).
fde-security-status	string	Shows whether the system is secured or unsecured: <ul style="list-style-type: none"> • Unsecured • Secured • Secured Lock Ready • Secured Locked
fde-security-status-numeric	uint32	Numeric equivalents for fde-security-status values. <ul style="list-style-type: none"> • 1: Unsecured • 2: Secured • 3: Secured Lock Ready • 4: Secured Locked
platform-type	string	Platform type.
platform-type-numeric	uint32	Numeric equivalent for the platform-type value.
platform-brand	string	Platform brand.
platform-brand-numeric	uint32	Numeric equivalent for the platform-brand value.
redundancy-mode	Embedded; see redundancy .	
unhealthy-component	Embedded; see unhealthy-component .	

system-parameters-table

This basetype is used by [show system-parameters](#).

Table 101 system-parameters-table properties

Name	Type	Description
ulp-enabled	string	Shows true to indicate that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers. The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can choose any available path to access a LUN regardless of vdisk ownership. When ULP is in use, the system's operating/cache-redundancy mode is shown as Active-Active ULP. ULP uses the T10 Technical Committee of INCITS Asymmetric Logical Unit Access (ALUA) extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.
profiles-enabled	string	Shows whether host profiles are enabled. <ul style="list-style-type: none"> • false: Host profiles are disabled.
max-ports	uint32	Number of host-interface ports in the controller enclosure.
max-drives	uint32	Number of disks that the system supports.
max-volumes	uint32	Number of volumes that the system supports.
max-vdisks	uint32	Number of linear disk groups that the system supports.
max-luns	uint32	Number of LUNs that the system supports.
max-owned-arrays-per-controller	uint32	Number of linear disk groups that each controller supports.
max-storage-pools-per-controller	uint32	The number of virtual pools that each controller supports.
max-components-per-storage-pool	uint32	The number of virtual pools that each pool can contain.
max-capi-arrays	uint32	Same as max-vdisks.
max-chunk-size	uint32	Maximum chunk size for disk groups.
min-chunk-size	uint32	Minimum chunk size for disk groups.
physical-position-offset	uint32	Starting index for physical components (enclosures, disks, etc.) in the storage system.
backoff-percentage	uint32	Percentage of disk capacity that is reserved to compensate for minor capacity differences between disk drives so they can be used interchangeably. This is not settable by users.
vdisk-metadata-size-perdisk-blocks	uint32	Amount of space reserved on a disk for metadata, in 512-byte blocks.
vdisk-metadata-size-blocks	uint32	Amount of metadata, in blocks, stored on each disk.
max-host-groups	uint32	The number of host groups that the system supports.
max-hosts-per-host-group	uint32	The maximum number of hosts that a host group can contain.
max-initiator	uint32	The maximum number of initiators that a host can contain.

Table 101 system-parameters-table properties (continued)

Name	Type	Description
max-volume-groups-per-controller	uint32	The maximum number of volume groups that each controller supports.
max-volumes-per-volume-group	uint32	The maximum number of volumes that a volume group can contain.
max-replication-sets	uint32	Number of replication sets that the system supports.
max-enclosures	uint32	Number of enclosures that the system supports.
local-controller	string	The ID of the controller you are accessing. <ul style="list-style-type: none"> A: Controller A. B: Controller B.
local-controller-numeric	uint32	Numeric equivalents for local-controller values. <ul style="list-style-type: none"> 0: B 1: A
serial-number	string	Last six digits of the midplane serial number.
external-targetid-control	string	Not used.
external-targetid-control-numeric	uint32	Not used.
lan-heartbeat	string	Not used.
lan-heartbeat-numeric	uint32	Not used.
ip-address-mode	string	<ul style="list-style-type: none"> CAPI_TWO_IP_ADDRESSES_MODE: Dual controller system has a unique IP address for each controller. CAPI_ONE_IP_ADDRESS_MODE: Dual controller system has the same IP address for both controllers, only one active at a time.
ip-address-mode-numeric	uint32	Numeric equivalents for lan-heartbeat values. <ul style="list-style-type: none"> 0: CAPI_TWO_IP_ADDRESSES_MODE 1: CAPI_ONE_IP_ADDRESS_MODE
debug-flags	uint32	For use by service personnel.
enclosure-flags	uint32	For internal use only.
num-global-spares	uint32	Number of global-spare disks defined in the storage system.
dynamic-spare-rescan-rate	uint32	Interval at which the system is scanned for disks automatically designated as spares, if the dynamic spares feature is enabled.
performance-tuning-flags	string	For internal use only.
performance-tuning-flags-numeric	uint32	Numeric equivalents for performance-tuning values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Table 101 system-parameters-table properties (continued)

Name	Type	Description
min-backing-store-size	uint32	Minimum snap-pool size in blocks.
max-fc-speed	string	Maximum FC host-port speed.
max-fc-speed-numeric	uint32	Numeric equivalent for the max-fc-speed value.
max-iscsi-speed	string	Maximum iSCSI host-port speed.
max-iscsi-speed-numeric	uint32	Numeric equivalent for the max-iscsi-speed value.

tasks

This basetype is used by [show tasks](#) and [show task-details \(Deprecated\)](#).

Table 102 tasks properties

Name	Type	Description
name	string	Task name.
type	string	Type of operation this task performs. <ul style="list-style-type: none"> TakeSnapshot ResetSnapshot VolumeCopy ReplicateVolume EnabledDSD DisabledDSD
status	string	Task status. <ul style="list-style-type: none"> Uninitialized: Task is not yet ready to run. Ready: Task is ready to run. Active: Task is running. Error: Task has an error. Invalid: Task is invalid. Complete: The task is complete. Deleted: The task has been deleted.
state	string	Current step of the task. <ul style="list-style-type: none"> For a TakeSnapshot task: <ul style="list-style-type: none"> Start VerifyVolume ValidateLicensingLimit CreateName CreateSnap VerifySnap InspectRetention FindOldestSnap UnmapSnap ResetSnap RenameSnap For a ResetSnapshot task: <ul style="list-style-type: none"> Start VerifySnap UnmapSnap ResetSnap For a VolumeCopy task: <ul style="list-style-type: none"> Start VerifyVolume CreateName ObtainMap UnmapVolume CreateVolume RemapVolume VerifyCreatedVolume

Table 102 tasks properties (continued)

Name	Type	Description
		<ul style="list-style-type: none"> • For a <code>ReplicateVolume</code> task: <ul style="list-style-type: none"> • <code>Start</code> • <code>VerifyVolume</code> • <code>CreateName</code> • <code>RepVolume</code> • <code>VerifySnap</code> • For an <code>EnableDSD</code> or <code>DisableDSD</code> task: <ul style="list-style-type: none"> • <code>Start</code>
error-message	string	<ul style="list-style-type: none"> • If an error occurred while processing the task, the error message. • Blank if no error has occurred.
associated-vdisk-serial	string	For a <code>VolumeCopy</code> task, the serial number of the destination vdisk.
task-details		Embedded; see replicate-volume-tasks , reset-snapshot-tasks , snap-tasks , snapshot-with-retention-tasks , volume-copy-tasks .

tier-hist-statistics

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

Table 103 tier-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	Total number of read and write operations since the last sampling time.
number-of-reads	uint64	Number of read operations since the last sampling time.
number-of-writes	uint64	Number of write operations since the last sampling time.
total-data-transferred	uint64	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted <code>total-data-transferred</code> value.
data-read	uint64	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted <code>data-read</code> value.
data-written	uint64	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted <code>data-written</code> value.
total-iops	uint64	Total number of read and write operations per second since the last sampling time.
read-iops	uint64	Number of read operations per second since the last sampling time.
write-iops	uint64	Number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	Total data transfer rate, in bytes per second, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted <code>total-bytes-per-second</code> value.
read-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted <code>read-bytes-per-second</code> value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted <code>write-bytes-per-second</code> value.
number-of-allocated-pages	uint64	The number of 4-MB pages allocated to volumes in the pool.
number-of-page-moves-in	uint64	The number of pages moved into this tier from a different tier.
number-of-page-moves-out	uint64	The number of pages moved out of this tier to other tiers.
number-of-page-rebalances	uint64	The number of pages moved between disks in this tier to automatically load balance.

Table 103 tier-hist-statistics properties (continued)

Name	Type	Description
number-of-initial-allocations	uint64	The number of 4-MB pages that are allocated as a result of host writes. This number does not include pages allocated as a result of background tiering page movement. (Tiering moves pages from one tier to another, so one tier will see a page deallocated, while another tier will show pages allocated. These background moves are not considered initial allocations.)
number-of-unmaps	uint64	The number of 4-MB pages that are automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).
number-of-rfc-copies	uint64	The number of 4-MB pages copied from spinning disks to SSD read cache (read flash cache).
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.

tier-statistics

This basetype is used by [show tier-statistics](#) and [show pool-statistics](#).

Table 104 tier-statistics properties

Name	Type	Description
serial-number	string	The serial number of the tier or pool.
pool	string	The name of the pool.
tier	string	<ul style="list-style-type: none">• Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).• Performance: The highest storage tier, which uses SSDs (high speed, low capacity).• Read Cache: The tier that provides read cache for a storage pool.• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
tier-numeric	uint32	Numeric equivalents for tier values. <ul style="list-style-type: none">• 0: N/A• 1: Performance• 2: Standard• 4: Archive• 8: Read Cache
pages-alloc-per-minute	uint32	The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.
pages-dealloc-per-minute	uint32	The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data.
pages-reclaimed	uint32	The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).
num-pages-unmap-per-minute	uint32	The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI unmap command, to free storage space as a result of deleting files or formatting volumes on the host.
resettable-statistics	Embedded; see resettable-statistics .	

tier-summary

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

Table 105 tier-summary properties

Name	Type	Description
<code>serial-number</code>	string	The serial number of the pool.
<code>pool</code>	string	The name of the pool.
<code>tier</code>	string	<ul style="list-style-type: none">• <code>Archive</code>: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).• <code>Performance</code>: The highest storage tier, which uses SSDs (high speed, low capacity).• <code>Read Cache</code>: The tier that provides read cache for a storage pool.• <code>Standard</code>: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
<code>tier-numeric</code>	uint32	Numeric equivalents for tier values. <ul style="list-style-type: none">• 0: N/A• 1: Performance• 2: Standard• 4: Archive• 8: Read Cache
<code>tier-hist-statistics</code>	Embedded; see tier-hist-statistics .	
<code>readcache-hist-statistics</code>	Embedded; see readcache-hist-statistics .	

tiers

This basetype is used by [show pools](#) and [show tiers](#).

Table 106 tiers properties

Name	Type	Description
serial-number	string	The serial number of the tier.
pool	string	The name of the pool.
tier	string	<ul style="list-style-type: none">• Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).• Performance: The highest storage tier, which uses SSDs (high speed, low capacity).• Read Cache: The tier that provides read cache for a storage pool.• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
tier-numeric	uint32	Numeric equivalents for tier values. <ul style="list-style-type: none">• 0: N/A• 1: Performance• 2: Standard• 4: Archive• 8: Read Cache
pool-percentage	uint8	The percentage of pool capacity that the tier occupies.
diskcount	uint8	The number of disks in the tier.
raw-size	string	The raw capacity of the disks in the tier, irrespective of space reserved for RAID overhead and so forth, formatted to use the current base, precision, and units.
raw-size-numeric	uint64	Unformatted raw-size value in 512-byte blocks.
total-size	string	The total capacity of the tier.
total-size-numeric	uint64	Unformatted total-size value in 512-byte blocks.
allocated-size	string	The amount of space currently allocated to volumes in the tier.
allocated-size-numeric	uint64	Unformatted allocated-size value in 512-byte blocks.
available-size	string	The available capacity in the tier.
available-size-numeric	uint64	Unformatted available-size value in 512-byte blocks.

time-settings-table

This basetype is used by [show controller-date](#).

Table 107 time-settings-table properties

Name	Type	Description
date-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), reported by the controller being accessed.
date-time-numeric	uint32	Unformatted date-time value.
time-zone-offset	string	The system's time zone as an offset in hours and minutes from UTC. This is shown only if NTP is enabled.
ntp-state	string	Shows whether Network Time Protocol (NTP) is in use. <ul style="list-style-type: none">• activated: NTP is enabled.• deactivated: NTP is disabled.
ntp-address	string	NTP server IP address, or 0.0.0.0 if not set.

unhealthy-component

This basetype is used by all commands that show component health.

Table 108 unhealthy-component properties

Name	Type	Description
component-type	string	Component type. <ul style="list-style-type: none">• super-cap: Supercapacitor pack• MC: Management Controller• port: Host port• controller: Controller module• expansion module: Expansion module• PSU: Power supply unit• disk: Disk• enclosure: Enclosure• vdisk: Vdisk (v2)• disk group: Disk group (v3)• fan• CompactFlash• disk slot• SAS port• sensor• network port• virtual pool• virtual disk group• volume• snap pool• volume: Master volume• snapshot• host• replication image• replication volume• replication set• volume map• system

Table 108 unhealthy-component properties (continued)

Name	Type	Description
component-type-numeric	uint32	Numeric equivalents for component-type values. <ul style="list-style-type: none"> • 0: super-cap • 1: MC • 2: port • 3: controller • 4: expansion module • 5: PSU • 6: disk • 7: enclosure • 8: vdisk (v2) or disk group (v3) • 9: fan • 10: CompactFlash • 11: disk slot • 12: SAS port • 13: sensor • 14: network port • 15: virtual pool • 16: virtual disk group • 17: volume • 18: snap pool • 19: volume (master volume) • 20: snapshot • 21: host • 22: replication image • 23: replication volume • 24: replication set • 25: volume map • 26: system
component-id	string	Component identifier, such as A for controller A.
basetype	string	Component basetype.
primary-key	string	Durable ID of the component.
health	string	Component health. <ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

unwritable-cache

This basetype is used by [show unwritable-cache](#).

Table 109 unwritable-cache properties

Name	Type	Description
<code>unwritable-a-percentage</code>	<code>uint8</code>	The percentage of cache space occupied by unwritable data in controller A.
<code>unwritable-b-percentage</code>	<code>uint8</code>	The percentage of cache space occupied by unwritable data in controller B.

USERS

This basetype is used by [show users](#).

Table 110 users properties

Name	Type	Description
username	string	User name.
roles	string	<ul style="list-style-type: none"> • monitor: User can view but not change system settings. • manage: User can view and change system settings. • admin: User can view and change system settings. • diagnostic: User can view and change system settings.
user-type	string	The user's level of technical expertise: Novice, Standard, Advanced, or Diagnostic. This parameter does not affect access to commands.
user-type-numeric	string	Numeric equivalents for user-type values. <ul style="list-style-type: none"> • 1: Novice • 2: Standard • 3: Advanced • 4: Diagnostic
user-locale	string	Display language for this user.
user-locale-numeric	string	Numeric equivalents for user-locale values. <ul style="list-style-type: none"> • 0: English • 1: Spanish • 2: French • 3: German • 4: Italian • 5: Japanese • 6: Netherlands • 7: Simplified Chinese • 8: Traditional Chinese • 9: Korean
interface-access-WBI	string	<ul style="list-style-type: none"> • x: User can use the web-browser interface. • (blank): User cannot access this interface.
interface-access-CLI	string	<ul style="list-style-type: none"> • x: User can use the command-line interface. • (blank): User cannot access this interface.
interface-access-FTP	string	<ul style="list-style-type: none"> • x: User can use the FTP interface. • (blank): User cannot access this interface.
interface-access-SMIS	string	<ul style="list-style-type: none"> • x: User can use the Storage Management Initiative Specification (SMI-S) interface. • (blank): User cannot access this interface.
interface-access-SNMP	string	<ul style="list-style-type: none"> • U: The user can access the SNMPv3 interface and view the MIB. • T: The user can access the SNMPv3 interface and receive trap notifications. • (blank): User cannot access this interface.
storage-size-base	uint8	The base for entry and display of storage-space sizes: <ul style="list-style-type: none"> • 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. • 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. <p>Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.</p>
storage-size-precision	uint8	The number of decimal places (1–10) for display of storage-space sizes.

Table 110 users properties (continued)

Name	Type	Description
storage-size-units	string	<p>The unit for display of storage-space sizes.</p> <ul style="list-style-type: none"> • auto: Lets the system determine the proper unit for a size. • MB: Megabytes. • GB: Gigabytes. • TB: Terabytes. <p>Based on the precision setting, if the selected unit is too large to meaningfully display a size, the system uses a smaller unit for that size. For example, if units is set to TB, precision is set to 1, and base is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.</p>
storage-size-units-numeric	string	<p>Numeric equivalents for storage-size-units values.</p> <ul style="list-style-type: none"> • 0: auto • 1: MB • 2: GB • 3: TB
temperature-scale	string	<ul style="list-style-type: none"> • Celsius: Use the Celsius scale to display temperature values. • Fahrenheit: Use the Fahrenheit scale to display temperature values.
temperature-scale-numeric	string	<p>Numeric equivalents for temperature-scale values.</p> <ul style="list-style-type: none"> • 0: Fahrenheit • 1: Celsius
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes).
authentication-type	string	<p>For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.</p> <ul style="list-style-type: none"> • none: No authentication. • MD5: MD5 authentication. • SHA: SHA (Secure Hash Algorithm) authentication.
authentication-type-numeric	string	<p>Numeric equivalents for authentication-type values.</p> <ul style="list-style-type: none"> • 0: none • 1: MD5 • 2: SHA
privacy-type	string	<p>For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the privacy-password property and the authentication-type property.</p> <ul style="list-style-type: none"> • none: No encryption. • DES: Data Encryption Standard. • AES: Advanced Encryption Standard.
privacy-type-numeric	string	<p>Numeric equivalents for privacy-type values.</p> <ul style="list-style-type: none"> • 0: none • 1: DES • 2: AES
password	string	User password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password.
privacy-password	string	Encryption password for an SNMPv3 user whose privacy type is set to DES or AES.
trap-destination	string	For an SNMPv3 user whose interface-access-SNMP property is set to snmptarget, this specifies the IP address of the host that will receive SNMP traps.

vdisk-hist-statistics

This basetype is used by `show vdisk-statistics` when the `historical` parameter is specified.

Table 111 vdisk-hist-statistics properties

Name	Type	Description
total-data-transferred	uint64	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
data-read	uint64	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted data-written value.
total-bytes-per-sec	uint64	Data transfer rate, in bytes per second, since the last sampling time. This is the sum of read-bytes-per-second and write-bytes-per-second.
total-bytes-per-sec-numeric	uint64	Unformatted total-bytes-per-second value.
read-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted read-bytes-per-second value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations since the last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.

vdisk-statistics

This basetype is used by `show vdisk-statistics` when the `historical` parameter is omitted.

Table 112 vdisk-statistics properties

Name	Type	Description
<code>name</code>	<code>string</code>	Vdisk name.
<code>serial-number</code>	<code>string</code>	Vdisk serial number.
<code>bytes-per-second</code>	<code>uint64</code>	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
<code>bytes-per-second-numeric</code>	<code>uint64</code>	Unformatted <code>bytes-per-second</code> value.
<code>iops</code>	<code>uint32</code>	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
<code>number-of-reads</code>	<code>uint64</code>	Number of read operations since these statistics were last reset or since the controller was restarted.
<code>number-of-writes</code>	<code>uint64</code>	Number of write operations since these statistics were last reset or since the controller was restarted.
<code>data-read</code>	<code>uint64</code>	Amount of data read since these statistics were last reset or since the controller was restarted.
<code>data-read-numeric</code>	<code>uint64</code>	Unformatted <code>data-read</code> value.
<code>data-written</code>	<code>uint64</code>	Amount of data written since these statistics were last reset or since the controller was restarted.
<code>data-written-numeric</code>	<code>uint64</code>	Unformatted <code>data-written</code> value.
<code>avg-rsp-time</code>	<code>uint32</code>	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
<code>avg-read-rsp-time</code>	<code>uint32</code>	Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.
<code>avg-write-rsp-time</code>	<code>uint32</code>	Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.
<code>reset-time</code>	<code>string</code>	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when these statistics were last reset, either by a user or by a controller restart.
<code>reset-time-numeric</code>	<code>uint32</code>	Unformatted <code>reset-time</code> value.
<code>start-sample-time</code>	<code>string</code>	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.
<code>start-sample-time-numeric</code>	<code>uint32</code>	Unformatted <code>start-sample-time</code> value.
<code>stop-sample-time</code>	<code>string</code>	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
<code>stop-sample-time-numeric</code>	<code>uint32</code>	Unformatted <code>stop-sample-time</code> value.

versions

This basetype is used by [show configuration](#), [show versions](#), and [versions \(Deprecated\)](#).

Table 113 versions properties

Name	Type	Description
sc-cpu-type	string	Storage Controller processor type.
bundle-version	string	Firmware bundle version.
build-date	string	Firmware bundle build date.
sc-fw	string	Storage Controller firmware version.
sc-baselevel	string	Storage Controller firmware base level.
sc-memory	string	Storage Controller memory-controller FPGA firmware version.
sc-loader	string	Storage Controller loader firmware version.
capi-version	string	Configuration API (CAPI) version.
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
ec-fw	string	Expander Controller firmware version.
pld-rev	string	Complex Programmable Logic Device (CPLD) firmware version.
hw-rev	string	Controller hardware version.
him-rev	string	Host interface module revision.
him-model	string	Host interface module model.
backplane-type	uint8	Backplane type.
host-channel_ revision	uint8	Host interface hardware (chip) version.
disk-channel_ revision	uint8	Disk interface hardware (chip) version.
mrc-version	string	Memory Reference Code (MRC) version for Storage Controller boot Flash.

virtual-disk-summary

This basetype is used by `show vdisk-statistics` when the `historical` parameter is specified.

Table 114 virtual-disk-summary properties

Name	Type	Description
<code>name</code>	<code>string</code>	Vdisk name.
<code>serial-number</code>	<code>string</code>	Vdisk serial number.
<code>vdisk-hist-statistics</code>		Embedded; see vdisk-hist-statistics .

virtual-disks

This basetype is used by [show configuration](#) and [show vdisks](#).

Table 115 virtual-disks properties

Name	Type	Description
name	string	Vdisk name.
size	string	Vdisk capacity, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
freespace	string	Amount of free (available) space in the vdisk, formatted to use the current base, precision, and units.
freespace-numeric	uint32	Unformatted freespace value in 512-byte blocks.
owner	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> • 0: B • 1: A
preferred-owner	string	Controller that owns the vdisk and its volumes during normal operation. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
preferred-owner-numeric	uint32	Numeric equivalents for preferred-owner values. <ul style="list-style-type: none"> • 0: B • 1: A
raidtype	string	Vdisk RAID level. <ul style="list-style-type: none"> • NRAID • RAID0 • RAID1 • RAID3 • RAID5 • RAID6 • RAID10 • RAID50
raidtype-numeric	uint32	Numeric equivalents for raidtype values. <ul style="list-style-type: none"> • 0: RAID0 • 1: RAID1 • 3: RAID3 • 5: RAID5 • 6: NRAID • 8: RAID50 • 10: RAID10 • 11: RAID6
storage-type	string	<ul style="list-style-type: none"> • Linear: The disk group acts as a linear pool. • Virtual: The disk group is in a virtual pool.

Table 115 virtual-disks properties (continued)

Name	Type	Description
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"> 0: Linear 1: Virtual
diskcount	uint16	Number of disks in the vdisk.
sparecount	uint16	Number of spare disks assigned to the vdisk.
chunksize	string	<ul style="list-style-type: none"> For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk. For NRAID and RAID 1, chunk size has no meaning and is therefore shown as not applicable (N/A). For RAID 50, the vdisk chunk size calculated as: <i>configured-chunk-size</i> x (<i>subvdisk-members</i> - 1). For a vdisk configured to use 32-KB chunk size and 4-disk subdisks, the value would be 96k (32KB x 3).
status	string	<p>Vdisk status.</p> <ul style="list-style-type: none"> CRIT: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down. DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged. FTDN: Fault tolerant with a down disk. The vdisk is online and fault tolerant, but some of its disks are down. FTOL: Fault tolerant and online. MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing. OFFL: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost. QTCR: Quarantined critical. The vdisk is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 vdisk or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined. QTDN: Quarantined with a down disk. The RAID-6 vdisk has one inaccessible disk. The vdisk is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined. QTOF: Quarantined offline. The vdisk is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 vdisk. STOP: The vdisk is stopped. UP: Up. The vdisk is online and does not have fault-tolerant attributes. UNKN: Unknown.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: FTOL 1: FTDN 2: CRIT 3: OFFL 4: QTCR 5: QTOF 6: QTDN 7: STOP 8: MSNG 9: DMGD 250: UP <i>other</i>: UNKN

Table 115 virtual-disks properties (continued)

Name	Type	Description
lun	uint32	Not used.
min-drive-size	string	Minimum disk size that can this vdisk can use, formatted to use the current base, precision, and units.
min-drive-size-numeric	uint32	Unformatted min-drive-size value in 512-byte blocks.
create-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the vdisk was created.
create-date-numeric	uint32	Unformatted create-date value.
cache-read-ahead	string	Not used.
cache-read-ahead-numeric	uint32	Not used.
cache-flush-period	uint32	Not used.
read-ahead-enabled	string	Not used.
read-ahead-enabled-numeric	uint32	Not used.
write-back-enabled	string	Not used.
write-back-enabled-numeric	uint32	Not used.
job-running	string	Same as <code>current-job</code> .
current-job	string	<p>Job running on the vdisk, if any.</p> <ul style="list-style-type: none"> • (blank): No job is running. • CPYBK: The vdisk is being used in a copyback operation. • DRSC: A disk is being scrubbed. • EXPD: The vdisk is being expanded. • INIT: The vdisk is initializing. • RCON: The vdisk is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The vdisk is being verified. • VRSC: The vdisk is being scrubbed.

Table 115 virtual-disks properties (continued)

Name	Type	Description
current-job-numeric	uint32	Numeric equivalents for current-job values. <ul style="list-style-type: none"> 0: (blank) 2: INIT 3: RCON 4: VRFY 5: EXPD 6: VRSC 7: DRSC 9: VREMV 11: CPYBK 12: VPREP 13: VDRAIN 14: VRECV
current-job-completion	string	<ul style="list-style-type: none"> 0%–99%: Percent complete of running job. (blank): No job is running (job has completed).
num-array-partitions	uint32	Number of volumes in the vdisk.
largest-free-partition-space	string	The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.
largest-free-partition-space-numeric	uint32	Unformatted largest-free-partition-space value in 512-byte blocks.
num-drives-per-low-level-array	uint8	<ul style="list-style-type: none"> For a RAID-10 or RAID-50 vdisk, the number of disks in each sub-vdisk. For other RAID levels, 1.
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.
new-partition-lba	string	Maximum number of 512-byte blocks that could be allocated to a newly created volume. The value is formatted to use the current base, precision, and units. Expanding a volume in the same vdisk will reduce this amount.
new-partition-lba-numeric	uint32	Unformatted new-partition-lba value in 512-byte blocks.
array-drive-type	string	Type of disks used in the vdisk. <ul style="list-style-type: none"> SAS: Enterprise SAS. SAS MDL: Midline SAS. sSAS: SAS SSD. MIX: Mixture of enterprise SAS and midline SAS disks.
array-drive-type-numeric	uint32	Numeric equivalents for array-drive-type values. <ul style="list-style-type: none"> 1: MIX 4: SAS 8: sSAS 11: SAS MDL
is-job-auto-abortable	string	<ul style="list-style-type: none"> false: The current job must be manually aborted before you can delete the vdisk. true: The current job will automatically abort if you delete the vdisk.

Table 115 virtual-disks properties (continued)

Name	Type	Description
is-job-auto-abortable-numeric	uint32	Numeric equivalents for is-job-auto-abortable values. <ul style="list-style-type: none"> 0: false 1: true
serial-number	string	Vdisk serial number.
blocks	uint64	Unformatted size value in 512-byte blocks.
disk-dsd-enable-vdisk	string	<ul style="list-style-type: none"> Disabled: DSD is disabled for the vdisk. Enabled - all spinning: DSD is enabled for the vdisk. Partial spin-down: DSD is enabled for the vdisk and its disks are partially spun down to conserve power. Full spin-down: DSD is enabled for the vdisk and its disks are fully spun down to conserve power.
disk-dsd-enable-numeric	uint32	Numeric equivalents for disk-dsd-enable-numeric values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled - all spinning 2: Partial spin-down 3: Full spin-down
disk-dsd-delay-numeric	uint32	The period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.
scrub-duration-goal	uint16	Not applicable.
health	string	<ul style="list-style-type: none"> OK Degraded Fault Unknown N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component		Embedded; see unhealthy-component .

volume-copy-status

This basetype is used by `show volumecopy-status`.

Table 116 volume-copy-status properties

Name	Type	Description
vc_volume_name	string	Destination volume name.
serial-number	string	Destination volume serial number.
pool	string	Pool name.
virtual-disk-name	string	Destination vdisk name.
source-volume	string	Source volume name.
progress	string	Percent complete of the volume copy (0%–99%).
status	string	<ul style="list-style-type: none">VC Online: A volume copy is in progress to the destination volume.VC Offline: The source volume went offline while a volume copy was in progress. When the source volume comes back online, the copy process resumes from the point where it stopped.Unknown: Status is unknown.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">0: VC Online1: VC Offline2: Unknown
status-reason	string	More information about the status value.

volume-copy-tasks

This basetype is used by [show tasks](#) and [show task-details \(Deprecated\)](#) for a VolumeCopy task.

Table 117 volume-copy-tasks properties

Name	Type	Description
source-volume-name	string	Source volume name.
source-volume-serial	string	Source volume serial number.
destination-vdisk-name	string	Destination vdisk name.
destination-pool-name	string	The name of the pool in which the new volume will be created.
destination-vdisk-serial	string	Destination vdisk serial number.
destination-pool-serial	string	The serial number of the destination pool.
destination-volume-prefix	string	Label that identifies copies created by this task.
include-modified-data	string	<ul style="list-style-type: none">modified: The copy includes modified snapshot data.preserved: The copy excludes modified snapshot data.
last-created	string	<ul style="list-style-type: none">The name of the last snapshot created by the task.Blank if the task has not created a snapshot.

volume-groups

This basetype is used by [show volume-groups](#).

Table 118 volume-group properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Volume group ID.
<code>group-name</code>	<code>string</code>	The name of the volume group in the format <i>volume-group.*</i> , where <i>*</i> represents all volumes in the group.
<code>serial-number</code>	<code>string</code>	The serial number of the volume group.
<code>type</code>	<code>string</code>	The group type, which is <code>Volume</code> .
<code>member-count</code>	<code>uint32</code>	The number of volumes in the volume group.
<code>volumes</code>	Embedded; see volumes .	

volume-group-view

This basetype is used by [show maps](#) if volume groups exist.

Table 119 volume-group-view properties

Name	Type	Description
durable-id	string	Volume group ID.
serial-number	string	The serial number of the volume group.
group-name	string	The name of the volume group in the format <i>volume-group.*</i> , where the * represents all volumes in the group.
volume-view-mappings	Embedded; see volume-view-mappings .	

volume-group-view-mappings

This basetype is used by [show maps](#).

Table 120 volume-group-view-mappings properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Mapping ID.
<code>parent-id</code>	<code>string</code>	For a mapping between a volume and an initiator, the volume ID — or if the volume is a member of a volume group, the volume-group ID.
<code>mapped-id</code>	<code>string</code>	The ID of the mapping target, such as an initiator.
<code>ports</code>	<code>string</code>	<ul style="list-style-type: none">The controller host ports to which the mapping applies.Blank if not mapped or mapped as <code>no-access</code>.
<code>access</code>	<code>string</code>	Type of host access to the volume. <ul style="list-style-type: none"><code>read-write</code>: Read and write.<code>read-only</code>: Read only.<code>no-access</code>: No access (masked).<code>not-mapped</code>: Not mapped.
<code>initiator-id</code>	<code>string</code>	<ul style="list-style-type: none">For an FC initiator, its WWPN.For a SAS initiator, its WWPN.For an iSCSI initiator, its node name (typically the IQN).<code>all other initiators</code>: The volume's default mapping.
<code>nickname</code>	<code>string</code>	<ul style="list-style-type: none">For a host, its name in the format <code>host-name.*</code>, where the <code>*</code> represents all initiators in the host.For a host group, its name in the format <code>host-group.*.*</code>, where the first <code>*</code> represents all hosts in the host group and the second <code>*</code> represents all initiators in those hosts.Blank if not set or for <code>all other initiators</code>.
<code>host-profile</code>	<code>string</code>	<ul style="list-style-type: none"><code>Standard</code>: Default profile.
<code>lun-view</code>		Embedded; see volume-view-mappings .

volume-names

This basetype is used by [show volume-names](#).

Table 121 volume-names properties

Name	Type	Description
volume-name	string	Volume name.
serial-number	string	Volume serial number.

volume-reservations

This basetype is used by [show volume-reservations](#).

Table 122 volume-reservations properties

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.
reservation-active	string	<ul style="list-style-type: none">Free: The volume is not reserved.Reserved: The volume has been reserved by a host.
reservation-active-numeric	uint32	Numeric equivalents for reservation-active values. <ul style="list-style-type: none">0: Free1: Reserved
host-id	string	Host WWPN or iSCSI node name.
port	string	The controller host-port identifiers.
reserve-type	string	The reservation type. <ul style="list-style-type: none">Undefined: The volume has no persistent reservations.Write Exclusive: Write commands are only allowed for a single reservation holder.Exclusive Access: Certain access (read, write) commands are only allowed for a single reservation holder.Write Exclusive - Registrants Only: Write commands are only allowed for registered hosts. There is a single reservation holder.Exclusive Access - Registrants Only: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.Write Exclusive - All Registrants: Write commands are only allowed for registered hosts. There is a single reservation holder.Exclusive Access - All Registrants: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.
reserve-type-numeric	uint32	Numeric equivalents for reserve-type values. <ul style="list-style-type: none">0: Undefined1: Write Exclusive3: Exclusive Access5: Write Exclusive - Registrants Only6: Exclusive Access - Registrants Only7: Write Exclusive - All Registrants8: Exclusive Access - All Registrants

volumes

This basetype is used by [show volumes](#) and [show volume-groups](#).

Table 123 volumes properties

Name	Type	Description
durable-id	string	Volume ID in the form V#, where # starts at 1 and increments for each new volume to uniquely identify it. The value is generated from available data in the current CLI session and may change after an MC restart.
virtual-disk-name	string	Vdisk name.
storage-pool-name	string	The name of the pool that contains the volume.
volume-name	string	Volume name.
size	string	Volume capacity, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
total-size	string	The total size of the volume.
total-size-numeric	uint32	Unformatted total-size value in 512-byte blocks.
allocated-size	string	The amount of space currently allocated to a virtual volume, or the total size of a linear volume.
allocated-size-numeric	uint32	Unformatted allocated-size value in 512-byte blocks.
storage-type	string	<ul style="list-style-type: none"> Linear: The volume is in a linear pool. Virtual: The volume is in a virtual pool.
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"> 0: Linear 1: Virtual
preferred-owner	string	Controller that owns the volume during normal operation. <ul style="list-style-type: none"> A: Controller A. B: Controller B.
preferred-owner-numeric	uint32	Numeric equivalents for preferred-owner values. <ul style="list-style-type: none"> 0: B 1: A
owner	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> A: Controller A. B: Controller B.
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> 0: B 1: A
serial-number	string	Volume serial number.

Table 123 volumes properties (continued)

Name	Type	Description
write-policy	string	<ul style="list-style-type: none"> write-back: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. write-through: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.
write-policy-numeric	uint32	<p>Numeric equivalents for write-policy values.</p> <ul style="list-style-type: none"> 0: write-through 1: write-back
cache-optimization	string	<ul style="list-style-type: none"> standard: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.
cache-optimization-numeric	uint32	<p>Numeric equivalents for cache-optimization values.</p> <ul style="list-style-type: none"> 0: standard 2: no-mirror
read-ahead-size	string	<p>The volume's read-ahead cache setting.</p> <ul style="list-style-type: none"> Disabled: Read-ahead is disabled. Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload. Stripe: Read-ahead is set to one stripe. The controllers treat non-RAID and RAID-1 vdisks internally as if they have a stripe size of 512 KB, even though they are not striped. 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.
read-ahead-size-numeric	uint32	<p>Numeric equivalents for read-ahead-size values.</p> <ul style="list-style-type: none"> -2: Stripe -1: Adaptive 0: Disabled 524288: 512 KB 1048576: 1 MB 2097152: 2 MB 4194304: 4 MB 8388608: 8 MB 16777216: 16 MB 33554432: 32 MB -2147483648: Maximum

Table 123 volumes properties (continued)

Name	Type	Description
volume-type	string	<ul style="list-style-type: none"> base: Base volume standard: Standard volume. standard*: Destination of an in-progress volume copy and cannot be mounted until the copy is complete. snap-pool: Snap-pool volume. master volume: Master volume. snapshot: Snapshot volume. replication source: Source for an in-progress replication to a secondary volume.
volume-type-numeric	uint32	Numeric equivalents for volume-type values. <ul style="list-style-type: none"> 0: standard 1: snap-pool 2: master volume 3: snapshot 4: standard* 8: replication source 15: base
volume-class	string	<ul style="list-style-type: none"> standard: Standard volume, not enabled for snapshots. PTSNAp: Snapshot-related volume such as a master volume, snap pool, or snapshot. Proxy: Destination of an in-progress replication from a remote volume, which when complete will change to type snapshot.
volume-class-numeric	uint32	Numeric equivalents for volume-class values. <ul style="list-style-type: none"> 0: standard 1: PTSNAp 3: Proxy
profile-preference	string	Not applicable.
profile-preference-numeric	uint32	Not applicable.
snapshot	string	Shows whether the volume is a snapshot.
volume-qualifier	string	<ul style="list-style-type: none"> N/A: Non-replication-specific volume such as a standard volume, master volume, snapshot, or snap pool. RSR: Replication-specific volume, such as a primary volume, secondary volume, replication snapshot, or replication image. RSR (DRM Promoted Secondary): During an actual site failover (not a test failover), the replication set's primary and secondary volumes are shown as primary volumes with a primary-volume conflict. This qualifier enables host-based Storage Replication Adapter (SRA) software to determine which volume is the failed-over secondary volume for disaster recovery management (DRM). If both systems are online and the communication link between them is up, both systems will show similar information. When the SRA completes a restore-replication or reverse-replication operation, this volume will be shown with the RSR qualifier.
volume-qualifier-numeric	uint32	Numeric equivalents for volume-qualifier values. <ul style="list-style-type: none"> 0: N/A 2: RSR 6: RSR (DRM Promoted Secondary)
blocks	uint64	Unformatted size value in 512-byte blocks.

Table 123 volumes properties (continued)

Name	Type	Description
capabilities	string	For internal use only.
volume-parent	string	Parent volume serial number. For example, the serial number of a snapshot's master volume.
snap-pool	string	Snap pool serial number.
replication-set	string	Replication set serial number.
attributes	string	Shows whether the volume's disks are single pathed.
virtual-disk-serial	string	Vdisk serial number.
volume-description	string	<ul style="list-style-type: none"> Blank by default.
wnn	string	World Wide Name of the volume, used by host-based Storage Replication Adapter (SRA) software to identify the volume.
progress	string	For a volume-copy operation, the percent complete (0%–99%).
progress-numeric	uint32	Unformatted progress value.
container-name	string	Vdisk name.
container-serial	string	Vdisk serial number.
allowed-storage-tiers	string	Not applicable.
allowed-storage-tiers-numeric	uint32	Not applicable.
threshold-percent-of-pool	string	For internal use only.
reserved-size-in-pages	uint32	For internal use only.
allocate-reserved-pages-first	string	For internal use only.
allocate-reserved-pages-first-numeric	uint32	For internal use only.
zero-init-page-on-allocation	string	For internal use only.
zero-init-page-on-allocation-numeric	uint32	For internal use only.

Table 123 volumes properties (continued)

Name	Type	Description
raidtype	string	Vdisk RAID level. <ul style="list-style-type: none"> • NRAID • RAID0 • RAID1 • RAID3 • RAID5 • RAID6 • RAID10 • RAID50
raidtype-numeric	string	Numeric equivalents for raidtype values. <ul style="list-style-type: none"> • 0: RAID0 • 1: RAID1 • 3: RAID3 • 5: RAID5 • 6: NRAID • 8: RAID50 • 10: RAID10 • 11: RAID6
pi-format	string	Not applicable.
pi-format-numeric	string	Not applicable.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
volume-group	string	If the volume is in a volume group, the name of the group. Otherwise, UNGROUPEDVOLUMES.
group-key	string	If the volume is in a volume group, the durable ID of the volume group. Otherwise, VGU.

volume-statistics

This basetype is used by [show volume-statistics](#).

Table 124 volume-statistics properties

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.
bytes-per-second	uint64	The data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	The number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	The number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	The amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	The amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
allocated-pages	uint32	The number of pages allocated to the volume.
percent-tier-ssd	uint16	The percentage of volume capacity occupied by data in the Performance tier.
percent-tier-sas	uint16	The percentage of volume capacity occupied by data in the Standard tier.
percent-tier-sata	uint16	The percentage of volume capacity occupied by data in the Archive tier.
percent-allocated-rfc	uint16	The percentage of volume capacity occupied by data in read cache.
pages-alloc-per-minute	uint32	The average number of pages being allocated to the volume each minute.
pages-dealloc-per-minute	uint32	The average number of pages being deallocated from the volume each minute.
shared-pages	uint32	The number of pages that are shared between this volume and any other volumes. This amount of storage will not be deallocated if the volume is deleted.
write-cache-hits	uint64	For the controller that owns the volume, the number of times the block written to is found in cache.
write-cache-misses	uint64	For the controller that owns the volume, the number of times the block written to is not found in cache.
read-cache-hits	uint64	For the controller that owns the volume, the number of times the block to be read is found in cache.

Table 124 volume-statistics properties (continued)

Name	Type	Description
read-cache-misses	uint64	For the controller that owns the volume, the number of times the block to be read is not found in cache.
small-destages	uint64	The number of times flush from cache to disk is not a full stripe.
full-stripe-write-destages	uint64	The number of times flush from cache to disk is a full stripe.
read-ahead-operations	uint64	The number of read pre-fetch or anticipatory-read operations.
write-cache-space	uint16	The cache size used on behalf of this volume.
write-cache-percent	uint32	The percentage of cache used on behalf of this volume.
reset-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted <code>reset-time</code> value.
start-sample-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.
start-sample-time-numeric	uint32	Unformatted <code>start-sample-time</code> value.
stop-sample-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
stop-sample-time-numeric	uint32	Unformatted <code>stop-sample-time</code> value.

volume-view

This basetype is used by [show maps](#) and [show volume-maps \(Deprecated\)](#).

Table 125 volume-view properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Volume ID in the form V#, where # starts at 1 and increments for each new volume to uniquely identify it. The value is generated from available data in the current CLI session and may change after an MC restart.
<code>volume-serial</code>	<code>string</code>	The serial number of the volume.
<code>volume-name</code>	<code>string</code>	Volume name.
<code>volume-view-mappings</code>		Embedded; see volume-view-mappings .

volume-view-mappings

This basetype is used by [show maps](#) and [show volume-maps \(Deprecated\)](#).

Table 126 volume-view-mappings properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Mapping ID.
<code>parent-id</code>	<code>string</code>	For a mapping between a volume and an initiator, the volume ID—or if the volume is a member of a volume group, the volume-group ID.
<code>mapped-id</code>	<code>string</code>	The ID of the mapping target, such as an initiator.
<code>ports</code>	<code>string</code>	<ul style="list-style-type: none">The controller host ports to which the mapping applies.Blank if not mapped or mapped as <code>no-access</code>.
<code>lun</code>	<code>string</code>	<ul style="list-style-type: none">The LUN that identifies the volume to a host.For a volume group, <code>*</code> means multiple LUNs are represented in the group.Blank if not mapped or mapped as <code>no-access</code>.
<code>access</code>	<code>string</code>	<ul style="list-style-type: none"><code>no-access</code>: Host is denied access to the volume.<code>not-mapped</code>: The volume is not mapped.<code>read-only</code>: Host has read access to the volume.<code>read-write</code>: Host has read and write access to the volume.
<code>access-numeric</code>	<code>uint32</code>	Numeric equivalents of <code>access</code> values. <ul style="list-style-type: none"><code>0</code>: not-mapped<code>1</code>: no-access<code>2</code>: read-only<code>3</code>: read-write
<code>identifier</code>	<code>string</code>	<ul style="list-style-type: none">For an FC initiator, its WWPN.For a SAS initiator, its WWPN.For an iSCSI initiator, its node name (typically the IQN).<code>all other initiators</code>: The volume's default mapping.
<code>nickname</code>	<code>string</code>	<ul style="list-style-type: none">For a host, its name in the format <code>host-name.*</code>, where the <code>*</code> represents all initiators in the host.For a host group, its name in the format <code>host-group.*.*</code>, where the first <code>*</code> represents all hosts in the host group and the second <code>*</code> represents all initiators in those hosts.Blank if not set or for <code>all other initiators</code>.
<code>host-profile</code>	<code>string</code>	<ul style="list-style-type: none"><code>Standard</code>: Default profile.

A Settings changed by restore defaults

This appendix summarizes the system settings that result from using the `restore defaults` command.

Table 127 Settings changed by restore defaults

Setting	Value
System information settings:	
<ul style="list-style-type: none"> System name System contact System location System information 	<ul style="list-style-type: none"> Uninitialized Name Uninitialized Contact Uninitialized Location Uninitialized Info
Management protocols settings:	
<ul style="list-style-type: none"> CLI/Telnet CLI/SSH FTP SNMP WBI/HTTP WBI/HTTPS SMI-S Unsecure SMI-S Debug In-band SES Activity Progress Reporting 	<ul style="list-style-type: none"> Enabled Enabled Enabled Enabled Disabled Enabled Enabled Disabled Disabled Enabled Disabled
Users	<p>All configured users are deleted and replaced with default user definitions and default settings:</p> <ul style="list-style-type: none"> User: <code>manage</code>; password: <code>!manage</code> User: <code>monitor</code>; password: <code>!monitor</code> User: <code>ftp</code>; password: <code>!ftp</code> Temperature scale: <code>Celsius</code> Timeout: 30 minutes
CLI/Telnet timeout	30 minutes
Tasks and schedules	(preserved) ¹
Remote system definitions	(preserved) ²
MC debug logs	(preserved) ³
SC event logs	(preserved)
Time/date and NTP settings	(preserved) ⁴
Network IP settings	(preserved) ⁵
SNMP settings:	
<ul style="list-style-type: none"> SNMP SNMP trap notification level SNMP trap host IPs SNMP read community SNMP write community 	<ul style="list-style-type: none"> Disabled none 0.0.0.0 public private

Table 127 Settings changed by restore defaults (continued)

Setting	Value
SMTP settings:	
<ul style="list-style-type: none"> • Email notification • Email notify filter • Email addresses • Email server • Email domain • Email sender • Log destination • Include logs 	<ul style="list-style-type: none"> • Disabled • (none) • (none) • (none) • (none) • (none) • (none) • Disabled
SSL/SSH certificates	(preserved) ⁶
Licenses	(preserved)
Vdisk metadata	(preserved)
Host port settings:	
<ul style="list-style-type: none"> • FC link speed • FC topology 	<ul style="list-style-type: none"> • Auto • Point-to-point
Host names	(preserved) ⁷
Drive spin down	Disabled
Advanced settings:	
<ul style="list-style-type: none"> • Vdisk background scrub • Partner firmware upgrade • Utility priority • SMART • Dynamic spare configuration • Enclosure polling rate • Supercap failure • CompactFlash failure • Auto write back • Disk background scrub 	<ul style="list-style-type: none"> • Disabled • Enabled • High • (preserved)⁸ • Disabled • 5 seconds • Enabled • Enabled • Enabled • Disabled
Native Command Queuing (NCQ)	Enabled
Managed Logs	Disabled
FDE settings	(preserved)

1. Factory default: no tasks or schedules.
2. Factory default: no remote system definitions.
3. Factory default: MC logs are cleared.
4. Factory default: NTP is disabled; NTP host IP address is 0.0.0.0; NTP offset is 0.
5. Factory default: IP address mode is manual; controller A IP is 10.0.0.2; controller B IP is 10.0.0.3; subnet mask is 255.255.255.0; gateway IP is 10.0.0.1.
6. Factory default: certificates are initialized.
7. Factory default: host names are cleared.
8. Factory default: no action for all disks.

Glossary

2U12	An enclosure that is two rack units in height and can contain 12 disks.
2U24	An enclosure that is two rack units in height and can contain 24 disks.
2U48	An enclosure that is two rack units in height and can contain 48 disks.
Additional Sense Code/Additional Sense Code Qualifier	<i>See</i> ASC/ASCQ.
Advanced Encryption Standard	<i>See</i> AES.
AES	Advanced Encryption Standard. A specification for the encryption of data using a symmetric-key algorithm.
Air Management Sled	<i>See</i> AMS.
Air Management Solution	<i>See</i> AMS.
allocated page	A page of storage-pool space that has been allocated to a volume to store data.
allocation rate	The rate, in pages per minute, at which a pool is allocating pages to its volumes because they need more space to store data.
ALUA	Asymmetric Logical Unit Access.
AMS	For a 2U12 or 2U24 enclosure, Air Management Sled. A drive blank designed to fill an empty disk slot in an enclosure to maintain optimum airflow through the chassis. For a 2U48 enclosure, Air Management Solution. A plastic insert designed to fill an empty disk bay (four disk slots) within a drawer to maintain optimum airflow through the chassis.
array	<i>See</i> storage system.
ASC/ASCQ	Additional Sense Code/Additional Sense Code Qualifier. Information on sense data returned by a SCSI device.
ATS	Automated tiered storage. A paged-storage feature that automatically uses the appropriate tier of disks to store data based on how frequently the data is accessed. This enables higher-cost, higher-speed disks to be used only for frequently needed data, while infrequently needed data can reside in lower-cost, lower-speed disks.
automated tiered storage	<i>See</i> ATS.
auto-write-through	<i>See</i> AWT.
available disk	A disk that is not a member of a disk group, is not configured as a spare, and is not in the leftover state. It is available to be configured as a part of a disk group or as a spare. <i>See also</i> compatible disk, dedicated spare, dynamic spare, and global spare.
AWT	Auto-write-through. A setting that specifies when the RAID controller cache mode automatically changes from write-back to write-through.
base volume	A virtual volume that is not a snapshot of any other volume, and is the root of a snapshot tree.
CAPI	Configuration Application Programming Interface. A proprietary protocol used for communication between the Storage Controller and the Management Controller in a controller module. CAPI is always enabled.
CHAP	Challenge-Handshake Authentication Protocol.
chassis	The sheetmetal housing of an enclosure.
child volume	The snapshot of a parent volume in a snapshot tree.
chunk size	The amount of contiguous data that is written to a disk group member before moving to the next member of the disk group.

CIM	Common Information Model. The data model for WBEM. It provides a common definition of management information for systems, networks, applications and services, and allows for vendor extensions.
CIM Query Language	<i>See</i> CQL.
CIMOM	Common Information Model Object Manager. A component in CIM that handles the interactions between management applications and providers.
CNC	Converged Network Controller. A controller module whose host ports can be set to operate in FC or iSCSI mode, using qualified SFP and cable options. Changing the host-port mode is also known as changing the ports' personality.
comma separated values	<i>See</i> CSV.
Common Information Model	<i>See</i> CIM.
Common Information Model Object Manager	<i>See</i> CIMOM.
compatible disk	A disk that can be used to replace a failed member disk of a disk group because it both has enough capacity and is of the same type (enterprise SAS, for example) as the disk that failed. <i>See also</i> available disk, dedicated spare, dynamic spare, and global spare.
complex programmable logic device	<i>See</i> CPLD.
Configuration Application Programming Interface	<i>See</i> CAPI.
controller A (or B)	A short way of referring to controller module A (or B).
controller enclosure	An enclosure that contains one or two controller modules.
controller module	A FRU that contains the following subsystems and devices: a Storage Controller processor; a Management Controller processor; a SAS expander and Expander Controller processor; management interfaces; cache protected by a supercapacitor pack and nonvolatile memory (CompactFlash); host, expansion, network, and service ports; and midplane connectivity. In a controller enclosure, the upper controller module is designated <i>A</i> and the lower one is designated <i>B</i> .
converged network controller	<i>See</i> CNC.
Coordinated Universal Time	<i>See</i> UTC.
CPLD	Complex programmable logic device. An electronic component used to build reconfigurable digital circuits. It can replace large numbers of logic gates.
CQL	CIM Query Language.
CRC	Cyclic Redundancy Check. A mathematical algorithm that, when implemented in software or hardware, can be used to detect errors in data.
CSV	Comma separated values. A format to store tabular data in plain-text form.
Cyclic Redundancy Check	<i>See</i> CRC.
DAS	Direct Attached Storage. A dedicated storage device that connects directly to a host without the use of a switch.
Data Encryption Standard	<i>See</i> DES.
deallocation rate	The rate, in pages per minute, at which a pool is deallocating pages from its volumes because they no longer need the space to store data.
dedicated spare	A disk that is reserved for use by a specific linear disk group to replace a failed disk. <i>See also</i> available disk, compatible disk, dynamic spare, and global spare.

default mapping	Host-access settings that apply to all initiators that are not explicitly mapped to that volume using different settings. <i>See also</i> explicit mapping and masking.
DES	Data Encryption Standard. An algorithm for the encryption of electronic data.
DHCP	Dynamic Host Configuration Protocol. A network configuration protocol for hosts on IP networks.
Direct Attached Storage	<i>See</i> DAS.
disk group	A set of disk drives that is configured to use a specific RAID type and provides storage capacity for a pool. <i>See also</i> linear disk group and virtual disk group.
Distributed Management Task Force	<i>See</i> DMTF.
DMTF	Distributed Management Task Force. An industry organization that develops and maintains standards for system management.
drain	Moving active volume data from a virtual disk group to other disk-group members within the same pool.
drawer	In a 2U48 enclosure, a FRU that holds up to 16 disks installed in groups of four. Each enclosure has three drawers.
drive enclosure	<i>See</i> expansion enclosure. <i>See also</i> JBOD.
drive spin down	<i>See</i> DSD.
DRM	Disaster recovery management. Storage-system firmware features that, when the Site Replication Adapter (SRA) feature is enabled, support the use of VMware's Site Recovery Manager to automate disaster-recovery failover and failback tasks. <i>See also</i> SRA.
DSD	Drive spin down. A power-saving feature that monitors disk activity in the storage system and spins down inactive disks based on user-selectable policies. Drive spin down is not applicable to disks in virtual pools.
dual-port disk	A disk that is connected to both controllers so it has two data paths, achieving fault tolerance.
Dynamic Host Configuration Protocol	<i>See</i> DHCP.
dynamic spare	An available compatible disk that is automatically assigned, if the dynamic spares option is enabled, to replace a failed disk in a disk group with a fault-tolerant RAID level. <i>See also</i> available disk, compatible disk, dedicated spare, and global spare.
EC	Expander Controller. A processor (located in the SAS expander in each controller module and expansion module) that controls the SAS expander and provides SES functionality. <i>See also</i> EMP, MC, and SC.
EMP	Enclosure management processor. An EC subsystem that provides SES data such as temperature, power supply and fan status, and the presence or absence of disks.
enclosure	A physical storage device that contains I/O modules, disk drives, and other FRUs.
enclosure management processor	<i>See</i> EMP.
Expander Controller	<i>See</i> EC.
expansion enclosure	An enclosure that contains one or two expansion modules. Expansion enclosures can be connected to a controller enclosure to provide additional storage capacity. <i>See also</i> JBOD.
expansion module	A FRU that contains the following subsystems and devices: a SAS expander and EC processor; host, expansion, and service ports; and midplane connectivity. In a drive enclosure, the upper expansion module is designated <i>A</i> and the lower one is designated <i>B</i> .
explicit mapping	Access settings for an initiator to a volume that override the volume's default mapping. <i>See also</i> default mapping and masking.
extrinsic methods	Methods which are particular to a specific class in SMI-S. <i>See also</i> intrinsic methods.
failback	<i>See</i> recovery.

failover	In an active-active configuration, failover is the act of temporarily transferring ownership of controller resources from an offline controller to its partner controller, which remains operational. The resources include pools, volumes, cache data, host ID information, and LUNs and WWNs. <i>See recovery.</i>
FC	Fibre Channel interface protocol.
FC-AL	Fibre Channel Arbitrated Loop. The FC topology in which devices are connected in a one-way loop.
FDE	Full disk encryption. A method by which you can secure the data residing on a system. <i>See also</i> lock key, passphrase, repurpose, and SED.
Fibre Channel Arbitrated Loop	<i>See FC-AL.</i>
field-programmable gate array	<i>See FPGA.</i>
field-replaceable unit	<i>See FRU.</i>
FPGA	Field-programmable gate array. An integrated circuit designed to be configured after manufacturing.
FRU	Field-replaceable unit. A part that can be removed and replaced by the user or support technician without having to send the product to a repair facility.
full disk encryption	<i>See FDE.</i>
global spare	A compatible disk that is reserved for use by any disk group with a fault-tolerant RAID level to replace a failed disk. <i>See also</i> available disk, compatible disk, dedicated spare, and dynamic spare.
HBA	Host bus adapter. A device that facilitates I/O processing and physical connectivity between a host and the storage system.
host	(v3) A user-defined group of initiators that represents a server or switch. (v2) An external port that the storage system is attached to. The external port may be a port in an I/O adapter in a server, or a port in a network switch. Product interfaces use the terms host and initiator interchangeably.
host bus adapter	<i>See HBA.</i>
host group	A user-defined group of hosts for ease of management, such as for mapping operations.
host port	A port on a controller module that interfaces to a host computer, either directly or through a network switch.
image ID	A globally unique serial number that identifies the point-in-time image source for a volume. All volumes that have identical image IDs have identical data content, whether they be snapshots or stand-alone volumes.
initiator	(v3) An external port to which the storage system is connected. The external port may be a port in an I/O adapter in a server, or a port in a network switch. (v2) <i>See host.</i>
I/O Manager	A MIB-specific term for a controller module.
I/O module	<i>See IOM.</i>
intrinsic methods	Methods inherited from CIM and present in all classes such as <code>getClass</code> , <code>createInstance</code> , <code>enumerateInstances</code> , and <code>associatorNames</code> in SMI-S.
IOM	Input/output module. An IOM can be either a controller module or an expansion module.
IQN	iSCSI Qualified Name.
iSCSI	Internet SCSI interface protocol.
iSNS	Internet Storage Name Service.
JBOD	“Just a bunch of disks.” <i>See</i> drive enclosure.
jumbo frame	In an iSCSI network, a frame that can contain 9000 bytes for large data transfers. A normal frame can contain 1500 bytes.

large form factor	<i>See</i> LFF.
LBA	Logical Block Address. The address used for specifying the location of a block of data.
leftover	The state of a disk that the system has excluded from a disk group because the timestamp in the disk's metadata is older than the timestamp of other disks in the disk group, or because the disk was not detected during a rescan. A leftover disk cannot be used in another disk group until the disk's metadata is cleared; for information and cautions about doing so, see documentation topics about clearing disk metadata.
LFF	Large form factor.
linear	The storage-class designation for logical components such as volumes that do not use paged-storage technology to virtualize data storage. The linear method stores user data in sequential, fully allocated physical blocks, using a fixed (static) mapping between the logical data presented to hosts and the physical storage where it is stored.
linear disk group	A set of disk drives that is configured to use a specific RAID type. The number of disks that a linear disk group can contain is determined by its RAID level. Any supported RAID level can be used. When a linear disk group is created, a linear pool with the same name is also created to represent the volume-containment properties of the disk group. <i>See also</i> linear pool.
linear pool	A container for volumes that is composed of one linear disk group.
LIP	Loop Initialization Primitive. An FC primitive used to determine the loop ID for a controller.
lock key	A system-generated value that manages the encryption and decryption of data on FDE-capable disks. <i>See also</i> FDE and passphrase.
logical block address	<i>See</i> LBA.
Logical Unit Number	<i>See</i> LUN.
loop	<i>See</i> FC-AL.
Loop Initialization Primitive	<i>See</i> LIP.
LUN	Logical Unit Number. A number that identifies a mapped volume to a host system.
MAC address	Media Access Control Address. A unique identifier assigned to network interfaces for communication on a network.
Management Controller	<i>See</i> MC.
Management Information Base	<i>See</i> MIB.
map/mapping	Settings that specify whether a volume is presented as a storage device to a host system, and how the host system can access the volume. Mapping settings include an access type (read-write, read-only, or no access), controller host ports through which initiators may access the volume, and a LUN that identifies the volume to the host system. <i>See also</i> default mapping, explicit mapping, and masking.
masking	A volume-mapping setting that specifies no access to that volume by hosts. <i>See also</i> default mapping and explicit mapping.
master volume	A volume that is enabled for snapshots and has an associated snap pool.
MC	Management Controller. A processor (located in a controller module) that is responsible for human-computer interfaces, such as the WBI, and computer-computer interfaces, such as SNMP, and interacts with the Storage Controller. <i>See also</i> EC and SC.
Media Access Control Address	<i>See</i> MAC address.
metadata	Data in the first sectors of a disk drive that stores all disk-, disk-group-, and volume-specific information including disk group membership or spare identification, disk group ownership, volumes and snapshots in the disk group, host mapping of volumes, and results of the last media scrub.
MIB	Management Information Base. A database used for managing the entities in SNMP.
mount	To enable access to a volume from a host OS. <i>See also</i> host, map/mapping, and volume.

network port	The Ethernet port on a controller module through which its Management Controller is connected to the network.
network time protocol	<i>See</i> NTP.
NTP	Network time protocol.
object identifier	<i>See</i> OID.
OID	Object Identifier. In SNMP, an identifier for an object in a MIB.
orphan data	<i>See</i> unwritable cache data.
overcommit	A setting that controls whether a virtual pool is allowed to have volumes whose total size exceeds the physical capacity of the pool.
overcommitted	The amount of storage capacity that is allocated to volumes exceeds the physical capacity of the storage system.
page	A range of contiguous LBAs in a virtual disk group.
paged storage	A method of mapping logical host requests to physical storage that maps the requests to virtualized "pages" of storage that are in turn mapped to physical storage. This provides more flexibility for expanding capacity and automatically moving data than the traditional, linear method in which requests are directly mapped to storage devices. Paged storage is also called virtual storage.
parent volume	A volume that has snapshots (can be either a base volume or a base snapshot volume). The parent of a snapshot is its immediate ancestor in the snapshot tree.
partner firmware update	<i>See</i> PFU.
passphrase	A user-created password that allows users to manage lock keys in an FDE-capable system. <i>See also</i> FDE and lock key.
PCBA	Printed circuit board assembly.
PFU	Partner firmware update. The automatic update of the partner controller when the user updates firmware on one controller.
PGR	Persistent group reservations.
PHY	One of two hardware components that form a physical connection between devices in a SAS network that enables transmission of data.
physical layer	<i>See</i> PHY.
point-to-point	Fibre Channel Point-to-Point topology in which two ports are directly connected.
pool	<i>See</i> linear pool and virtual pool.
POST	Power-on self test. Tests that run immediately after a device is powered on.
Power-On Self Test	<i>See</i> POST.
power supply unit	<i>See</i> PSU.
primary volume	The volume that is the source of data in a replication set and that can be mapped to hosts. For disaster recovery purposes, if the primary volume goes offline, a secondary volume can be designated as the primary volume. The primary volume exists in a primary disk group in the primary (or local) storage system.
proxy volume	A virtual volume in the local system that represents a volume in a remote system. Proxy volumes are used internally by the controllers to perform actions such as transferring replication data.
PSU	Power supply unit. The power supply FRU.
quick rebuild	A feature for virtual storage that reduces the time that user data is less than fully fault-tolerant after a disk failure in a disk group. The quick-rebuild process rebuilds only data stripes that contain user data. Data stripes that have not been allocated to user data are rebuilt in the background.
RAID head	<i>See</i> controller enclosure.
read cache	A special disk group using SSDs that can be added to a virtual pool for the purpose of speeding up read access to data stored on spinning disks elsewhere in the pool. Read cache is also referred to as read flash cache.

read flash cache	<i>See</i> read cache.
recovery	In an active-active configuration, recovery is the act of returning ownership of controller resources to a controller (which was offline) from its partner controller. The resources include volumes, cache data, host ID information, and LUNs and WWNs. <i>See also</i> failover.
remote replication	Asynchronous (batch) replication of block-level data from a volume in a primary system to a volume in one or more secondary systems by creating a replication snapshot of the primary volume and copying the snapshot data to the secondary systems via Fibre Channel or iSCSI links. The capability to perform remote replication is a licensed feature (AssuredRemote).
remote syslog support	<i>See</i> syslog.
replication image	A conceptual term for replication snapshots that have the same image ID in primary and secondary systems. These synchronized snapshots contain identical data and can be used for disaster recovery.
replication-prepared volume	A volume created for the purpose of being the secondary volume in a replication set. Replication-prepared volumes are automatically created by the WBI Replication Setup Wizard, or they can be created manually in the CLI or the WBI.
replication set	Associated primary and secondary volumes that are enabled for replication and that typically reside in two physically or geographically separate storage systems. <i>See</i> primary volume and secondary volume.
replication snapshot	A special type of snapshot, created by the remote replication feature, that preserves the state of data of a replication set's primary volume as it existed when the snapshot was created. For a primary volume, the replication process creates a replication snapshot on both the primary system and, when the replication of primary-volume data to the secondary volume is complete, on the secondary system. Replication snapshots are unmappable and are not counted toward a license limit, although they are counted toward the system's maximum number of volumes. A replication snapshot can be exported to a regular, licensed snapshot. <i>See also</i> replication sync point.
replication sync point	The state of a replication snapshot whose corresponding primary or secondary snapshot exists and contains identical data. For a replication set, four types of sync point are identified: the only replication snapshot that is copy-complete on any secondary system is the “only sync point”; the latest replication snapshot that is copy-complete on any secondary system is the “current sync point”; the latest replication snapshot that is copy-complete on all secondary systems is the “common sync point”; a common sync point that has been superseded by a new common sync point is an “old common sync point.”
repurpose	A method by which all data on a system or disk is erased in an FDE-capable system. Repurposing unsecures the system and disks without needing the correct passphrase. <i>See also</i> FDE and passphrase.
RFC	Read flash cache. <i>See</i> read cache.
SAS	Serial Attached SCSI interface protocol or disk-drive architecture.
SC	Storage Controller. A processor (located in a controller module) that is responsible for RAID controller functions. The SC is also referred to as the RAID controller. <i>See also</i> EC and MC.
SCSI Enclosure Services	<i>See</i> SES.
secondary volume	The volume that is the destination for data in a replication set and that is not accessible to hosts. For disaster recovery purposes, if the primary volume goes offline, a secondary volume can be designated as the primary volume. The secondary volume exists in a secondary disk group in a secondary (or remote) storage system. The contents of a secondary volume are in a constant state of flux and are not in a consistent state while a replication is in process. Only snapshots that are associated with a secondary volume are data consistent.
secret	For use with CHAP, a password that is shared between an initiator and a target to enable authentication.
secure hash algorithm	<i>See</i> SHA.
secure shell	<i>See</i> SSH.
Secure Sockets Layer	<i>See</i> SSL.

SED	Self-encrypting drive. A disk drive that provides hardware-based data encryption and supports use of the storage system's Full Disk Encryption feature. <i>See also</i> FDE.
SEEPROM	Serial electrically erasable programmable ROM. A type of nonvolatile (persistent if power removed) computer memory used as FRU ID devices.
Self-Monitoring Analysis and Reporting Technology	<i>See</i> SMART.
serial electrically erasable programmable ROM	<i>See</i> SEEPROM.
Service Location Protocol	<i>See</i> SLP.
SES	SCSI Enclosure Services. The protocol that allows the initiator to communicate with the enclosure using SCSI commands.
SFCB	Small Footprint CIM Broker.
SFF	Small form factor. A type of disk drive.
SHA	Secure Hash Algorithm. A cryptographic hash function.
SLP	Service Location Protocol. Enables computers and other devices to find services in a local area network without prior configuration.
Small Footprint CIM Broker	<i>See</i> SFCB.
small form factor	<i>See</i> SFF.
SMART	Self-Monitoring Analysis and Reporting Technology. A monitoring system for disk drives that monitors reliability indicators for the purpose of anticipating disk failures and reporting those potential failures.
SMI-S	Storage Management Initiative - Specification. The SNIA standard that enables interoperable management of storage networks and storage devices. The interpretation of CIM for storage. It provides a consistent definition and structure of data, using object-oriented techniques.
snap pool	A volume that stores data that is specific to snapshots of an associated master volume, including copy-on-write data and data written explicitly to the snapshots. A snap pool cannot be mapped.
snapshot	A "virtual" volume that preserves the state of a master volume's data as it existed when the snapshot was created. Data associated with a snapshot is recorded in both the master volume and in its associated snap pool. A snapshot can be mapped and written to. The capability to create snapshots is a licensed feature (AssuredSnap). Snapshots that can be mapped to hosts are counted against the snapshot-license limit, whereas transient and unmapable snapshots are not.
snapshot tree	A group of virtual volumes that are interrelated due to creation of snapshots. Since snapshots can be taken of existing snapshots, volume inter-relationships can be thought of as a "tree" of volumes. A tree can be 254 levels deep. <i>See also</i> base volume, child volume, parent volume, and source volume.
SNIA	Storage Networking Industry Association. An association regarding storage networking technology and applications.
source volume	A volume that has snapshots. Used as a synonym for parent volume.
sparse snapshot	A type of point-in-time copy that preserves the state of data at an instant in time by storing only those blocks that are different from an already existing full copy of the data.
SRA	Storage Replication Adapter. A host-based software component that allows VMware's Site Recovery Manager to manage the storage-system firmware's disaster recovery management (DRM) features, automating disaster-recovery failover and failback tasks. The SRA uses the CLI XML API to control the storage system. <i>See also</i> DRM.
SSD	Solid-state drive.
SSH	Secure Shell. A network protocol for secure data communication.

SSL	Secure Sockets Layer. A cryptographic protocol that provides security over the internet.
standard volume	A volume that can be mapped to initiators and presented as a storage device to a host system, but is not enabled for snapshots.
Storage Controller	<i>See</i> SC.
Storage Management Initiative - Specification	<i>See</i> SMI-S.
Storage Networking Industry Association	<i>See</i> SNIA.
storage system	A controller enclosure with at least one connected drive enclosure. Product documentation and interfaces use the terms storage system and system interchangeably.
syslog	A protocol for sending event messages across an IP network to a logging server.
thin provisioning	A feature that allows actual storage for a virtual volume to be assigned as data is written, rather than storage being assigned immediately for the eventual size of the volume. This allows the storage administrator to overcommit physical storage, which in turn allows the connected host system to operate as though it has more physical storage available than is actually allocated to it. When physical resources fill up, the storage administrator can add storage capacity on demand.
tier	A homogeneous set of disk drives, typically of the same capacity and performance level, that comprise one or more disk groups in the same pool. Tiers differ in their performance, capacity, and cost characteristics, which forms the basis for the choices that are made with respect to which data is placed in which tier. The predefined tiers are: <ul style="list-style-type: none"> • Performance, which uses SAS SSDs (high speed, low capacity) • Standard, which uses enterprise-class spinning SAS disks (lower speed, higher capacity) • Archive, which uses midline spinning SAS disks (low speed, high capacity).
tier migration	The automatic movement of blocks of data, associated with a single volume, between tiers based on the access patterns that are detected for the data on that volume.
tray	<i>See</i> enclosure.
UCS Transformation Format - 8-bit	<i>See</i> UTF-8.
ULP	Unified LUN Presentation. A RAID controller feature that enables a host system to access mapped volumes through any controller host port. ULP incorporates Asymmetric Logical Unit Access (ALUA) extensions.
undercommitted	The amount of storage capacity that is allocated to volumes is less than the physical capacity of the storage system.
Unified LUN Presentation	<i>See</i> ULP.
unmount	To remove access to a volume from a host OS.
unwritable cache data	Cache data that has not been written to disk and is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume's disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host system and disk. Unwritable cache data is also called orphan data.
UTC	Coordinated Universal Time. The primary time standard by which the world regulates clocks and time. It replaces Greenwich Mean Time.
UTF-8	UCS transformation format - 8-bit. A variable-width encoding that can represent every character in the Unicode character set used for the CLI and WBI interfaces.
v2	The legacy interface for managing linear storage. This is the default for a system that has been upgraded from a previous release.
v3	The new interface for managing virtual and linear storage. This is the default for a new installation.
vdisk	A virtual disk comprising the capacity of one or more disks. The number of disks that a vdisk can contain is determined by its RAID level. <i>See</i> linear disk group.

vdisk spare	<i>See</i> dedicated spare.
virtual	The storage-class designation for logical components such as volumes that use paged-storage technology to virtualize data storage. <i>See</i> paged storage.
virtual disk	<i>See</i> vdisk.
virtual disk group	A set of disk drives that is configured to use a specific RAID type. The number of disks that a linear disk group can contain is determined by its RAID level. A virtual disk group can use RAID 1, 5, 6, or 10. A virtual disk group can be added to a new or existing virtual pool. <i>See also</i> virtual pool.
virtual pool	A container for volumes that is composed of one or more virtual disk groups.
volume	A logical representation of a fixed-size, contiguous span of storage that is presented to host systems for the purpose of storing data.
volume copy	An independent copy of the data in a linear volume. The capability to create volume copies is a licensed feature (AssuredCopy) that makes use of snapshot functionality.
volume group	A user-defined group of volumes for ease of management, such as for mapping operations.
WBEM	Web-Based Enterprise Management. A set of management and internet standard technologies developed to unify the management of enterprise computing environments.
web-based interface/web-browser interface	<i>See</i> WBI.
WBI	Web-browser interface. The primary interface for managing the system. A user can enable the use of HTTP, HTTPS for increased security, or both.
Web-Based Enterprise Management	<i>See</i> WBEM.
World Wide Name	<i>See</i> WWN.
World Wide Node Name	<i>See</i> WWNN.
World Wide Port Name	<i>See</i> WWPN.
WWN	World Wide Name. A globally unique 64-bit number that identifies a device used in storage technology.
WWNN	World Wide Node Name. A globally unique 64-bit number that identifies a device.
WWPN	World Wide Port Name. A globally unique 64-bit number that identifies a port.

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